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STUB POND DAM (CT 002.. (U) CORPS OF ENGINEERS WALTHAM
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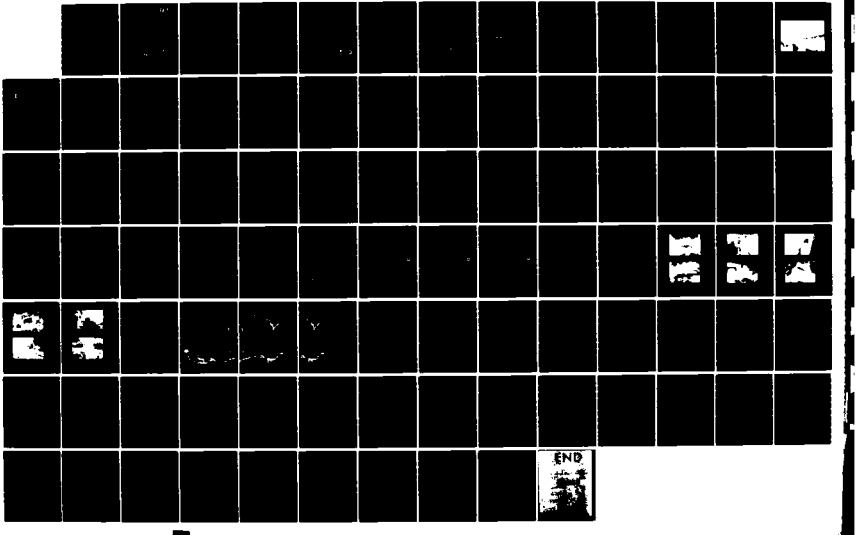

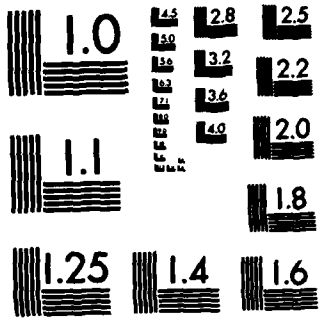

CONNECTICUT RIVER BASIN
AVON, CONNECTICUT

STUB POND DAM

CT 00265

PHASE 1 INSPECTION REPORT
NATIONAL DAM INSPECTION PROGRAM

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

APRIL, 1981

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

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Connecticut River Basin
Abon, Conn.

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This dam consists of an earth embankment, and a concrete wall which extends from the embankments to the spillway on each end of the spillway. Based on the visual inspection and past operational performance, the dam is judged to be in POOR condition. There are large trees growing on the embankment. The concrete wall is severely cracked and seepage is occuring through the wall and all along the downstream of the embankment. This dam is classified as SMALL in size and a SIGNIFICANT hazard potential structure in accordance with the Corps of Engineers.

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DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02254

REPLY TO
ATTENTION OF:
NEDED

MAY 19 1981

Honorable William A. O'Neill
Governor of the State of Connecticut
State Capitol
Hartford, Connecticut 06115

Dear Governor O'Neill:

Inclosed is a copy of the Stub Pond Dam (CT-00265) Phase I Inspection Report, which was prepared under the National Program for Inspection of Non-Federal Dams. This report is presented for your use and is based upon a visual inspection, a review of the past performance and a brief hydrological study of the dam. A brief assessment is included at the beginning of the report. I have approved the report and support the findings and recommendations described in Section 7 and ask that you keep me informed of the actions taken to implement them. This follow-up action is a vitally important part of this program.

A copy of this report has been forwarded to the Department of Environmental Protection, the cooperating agency for the State of Connecticut. In addition, a copy of the report has also been furnished the owner, Avon Parks Property, P.O. Box 354, Farmington, Connecticut 06032.

Copies of this report will be made available to the public, upon request, by this office under the Freedom of Information Act. In the case of this report the release date will be thirty days from the date of this letter.

I wish to take this opportunity to thank you and the Department of Environmental Protection for your cooperation in carrying out this program.

Sincerely,

C.E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

Incl
As stated

CONNECTICUT RIVER BASIN

AVON, CONNECTICUT

STUB POND DAM

CT 00265

PHASE 1 INSPECTION REPORT

NATIONAL DAM INSPECTION PROGRAM

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

Identification No.:	CT 00265
Name of Dam:	Stub Pond Dam
Town:	Avon
County:	Hartford County, Connecticut
Stream:	Nod Brook
Date of Inspection:	November 14, 1980

BRIEF ASSESSMENT

This dam consists of an earth embankment, and a concrete wall which extends from the embankments to the spillway on each end of the spillway.

The earth embankment is 500 feet long, 8 feet wide at the top and 6.7 feet high, with a downstream slope of 2H:1V. The concrete spillway is located at the western end of the dam and is 40 feet long with 15 inch high permanently attached timber flashboards. The concrete wall extends 10 feet west and 54 feet east of the spillway. The drainage area is 5.8 square miles.

The dam has existed at least since 1918 at which time it was modified by the addition of various water supply appurtenances. Originally used for water supply, the dam is presently used for passive recreation. The dam is presently owned by Avon Park Properties of Farmington, Connecticut.

Based on the visual inspection, and past operational performance, the dam is judged to be in POOR condition. There are large trees growing on the embankment. The concrete wall is severely cracked and spalled and has been exposed on the downstream side by erosion. Seepage is occurring through the wall and all along the downstream toe of the embankment.

This dam is classified as SMALL in size and a SIGNIFICANT hazard potential structure in accordance with the Recommended Guidelines for Safety Inspection of Dams, by the Corps of Engineers. The impoundment storage at the top of the dam is 30 ac.-ft. and the maximum height of the dam is 6.7 feet. Failure of the dam could result in the possible loss of a few lives and appreciable economic damage to seven buildings along the downstream channel. The depth of inundation of the buildings would be 9 feet before and 0.5 to 2 feet after dam failure.

The test flood for this dam is the 100 year flood. The test flood has an inflow equal to 1810 cfs and an outflow discharge equal to 1800 cfs at a stillwater elevation of 233.1 which will overtop the dam by 1.0 foot. The maximum outflow capacity of the spillway with the water level at the top of the dam is 53 cfs, which is 3 percent of the test flood outflow.

It is recommended that the following items be studied further by a qualified registered engineer. The removal of all trees and root systems from the dam and within 15 feet of the downstream toe and backfilling with suitable compacted material. Conduct an analysis of the structural integrity of the broken and cracked concrete walls and concrete wingwalls and design repairs as required. Investigate the upstream face of the embankment and concrete walls with the pond lowered and make appropriate recommendations. Fill the eroded areas downstream of the concrete wall and provide erosion control. Conduct a detailed hydrologic/hydraulic investigation to determine the need for and means of increasing the discharge capacity of the spillway and/or providing additional freeboard. Determine the operability of the outlet works and provide a low level outlet if the existing 36 inch pipe or blowoff can not be utilized. Investigate the seepage along the toe and, if required, provide corrective measures.

The following remedial measures should be taken by the owner: Brush should be removed from the dam, debris should be cleared from the spillway and downstream channel, a downstream warning plan and an annual inspection program should be developed. The flashboards should be immediately removed from the spillway.

Recommendations and remedial measures that should be implemented within one year, except as noted, of receipt of this Phase I Inspection Report are further described in Section 7.

JAMES P. PURCELL ASSOCIATES, INC.

Sudhir A. Shah, P.E.
Director of Engineering
Connecticut P.E. No. 8012

This Phase I Inspection Report on Stub Pond Dam (CT-00265) has been reviewed by the undersigned Review Board members. In our opinion, the reported findings, conclusions, and recommendations are consistent with the Recommended Guidelines for Safety Inspection of Dams, and with good engineering judgement and practice, and is hereby submitted for approval.

JOSEPH W. FINEGAN, JR., MEMBER
Water Control Branch
Engineering Division

ARAMAST MAHTESIAN, MEMBER
Geotechmical Engineering Branch
Engineering Division

CARNEY M. TERZIAN, CHAIRMAN
Design Branch
Engineering Division

APPROVAL RECOMMENDED:

JOE B. FRYAR
Chief, Engineering Division

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation. However, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through continued care and inspection can there by any chance that unsafe conditions be detected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the spillway test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and downstream damage potential.

The Phase I Investigation does not include an assessment of the need for fences, gates, no-trespassing signs, repairs to existing fences and railings and other items which may be needed to minimize trespass and provide greater security for the facility and safety to the public. An evaluation of the project for compliance with OSHA rules and regulations is also excluded.

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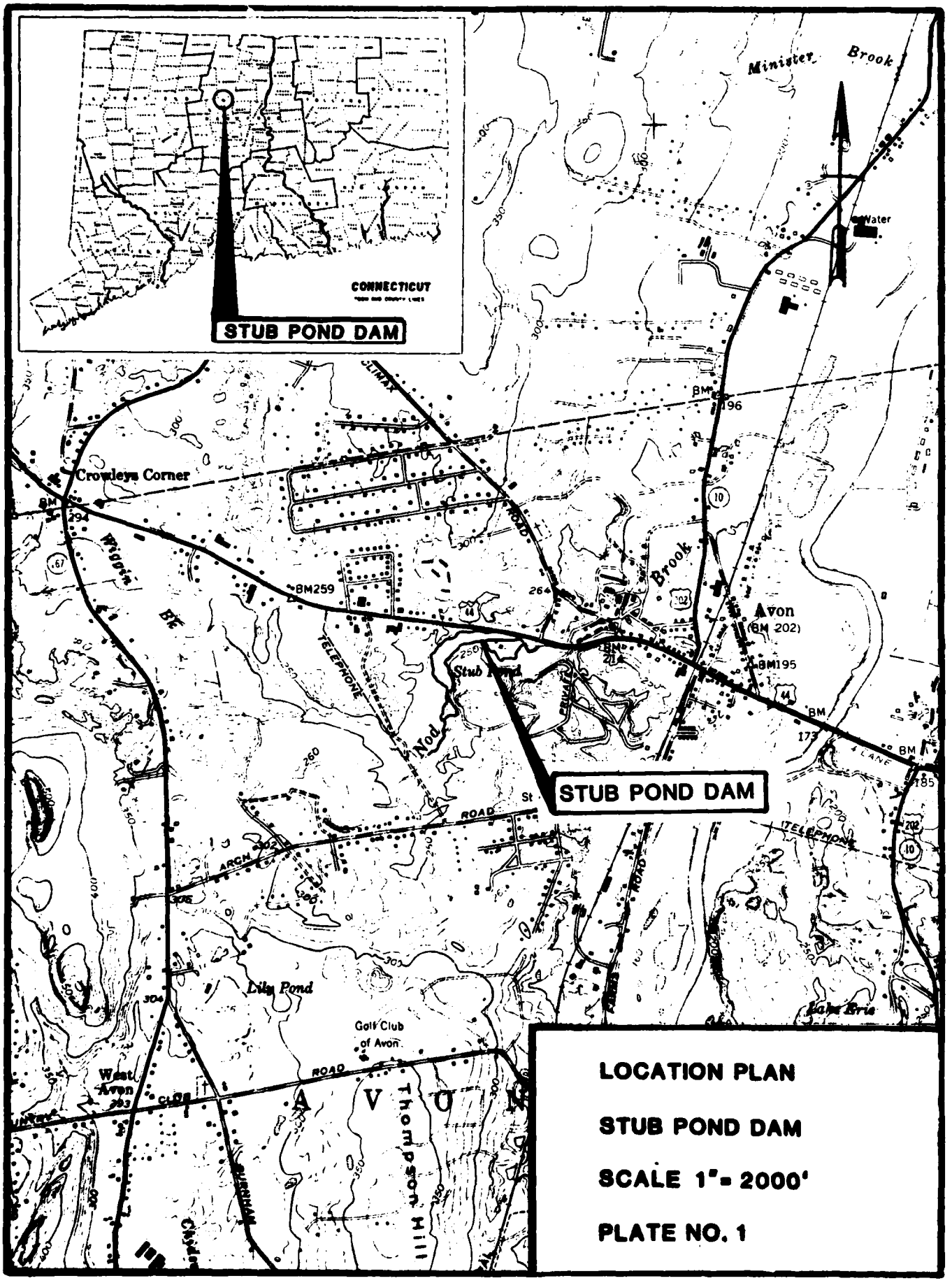
APPENDICES

OVERVIEW PHOTO - STUB POND DAM

PHOTO TAKEN DECEMBER 15, 1980



LOCATION PLAN

STUB POND DAM

SCALE 1"= 2000'

PLATE NO. 1

NATIONAL DAM INSPECTION PROGRAM

PHASE I - INSPECTION REPORT

NAME OF DAM: STUB POND DAM

SECTION 1

PROJECT INFORMATION

1.1 General:

a. Authority:

Public Law 92-367, August 8, 1972, authorized the Secretary of the Army through the Corps of Engineers to initiate a national program of dam inspection throughout the United States. The New England Division of the Corps of Engineers has been assigned the responsibility of surpervising the inspection of dams within the New England Region. James P. Purcell Associates, Inc. has been retained by the New England Division to inspect and report on selected dams in the State of Connecticut. Authorization and notice to proceed was issued to James P. Purcell Associates, Inc., under a letter from William E. Hodgson, Jr., Colonel, Corps of Engineers. Contract No. DACW33-81-C-0009 has been assigned by the Corps of Engineers for this work.

b. Purpose:

1. Perform technical inspection and evaluation of non-federal dams to identify conditions which threaten the public safety and thus permit correction in a timely manner by non-federal interests.

2. Encourage and prepare the States to initiate quickly, effective dam safety programs for non-federal dams.

3. To update, verify and complete the National Inventory of Dams.

1.2 Description of Project:

a. Location:

Stub Pond Dam is located in the Town of Avon, in Hartford County, Connecticut.

It is on the south side of U.S. Route 44 approximately 0.75 miles west of the village of Avon (See Plate No. 1). The dam impounds water from Nod Brook and is located approximately 8000 feet upstream of the confluence with the Farmington River. The impoundment is "L" shaped with ends pointing east and south. The dam forms the south side of the eastern end of the "L".

The latitude is 41°-48'-38.5" and the longitude is 72°-50'-32.5".

All elevations used in this report are based on the National Geodetic Vertical Datum (NGVD).

b. Description of Dam and Appurtenances:

Stub Pond consists of a 500 foot long earth embankment, a 64 foot long concrete wall and a 40 foot long concrete spillway. The maximum height of the dam is 6.7 feet. The top width of the embankment is 8 feet, the downstream side slope is 2H:1V, and the top is 0.5 to 1.0 feet above the top of the concrete walls. The top width of the concrete wall varies from 18 inches to 42 inches. The spillway contains 15 inch high permanently attached timber flashboards. The spillway is at the western end of the dam and the concrete wall extends 10 feet west and 54 feet east of the spillway.

There is a gate house at the eastern end of the dam which contains the control mechanism(s) to a 36 inch pipe. A metal bar rack protects the entrance to the pipe. This pipe was used in the past to supply water to the former Ensign-Bickford facilities downstream of the dam. It is suspected that this pipe is abandoned and terminates at the filled ditch 1000 feet each of the gate house (See Plan Page B-8). The outlet to the 36 inch pipe could not be located.

The visual inspection noted the outlet of what appears to be a blowoff at the concrete wall. No information concerning its size, control mechanism or operability could be found.

There is also a 6 inch pipe through the concrete wall which is controlled by gate valves on the upstream and downstream side of the wall. This pipe connects to an abandoned 6 inch water supply pipe of the Avon Water Company, Possibly, this pipe outlets at a ditch to the east of the gate house where a 6 inch C.I. pipe with flap gate was observed (See Plan Page B-8).

c. Size Classification:

The size classification of this dam is SMALL. The impoundment storage at the top of the dam is 30 ac.-ft. and the maximum height of the dam is 6.7 feet.

d. Hazard Classification:

The hazard classification of this dam is SIGNIFICANT as per the criteria set forth in the Recommended Guidelines for Safety Inspection of Dams, by the Corps of

Engineers. Seven office and storage buildings may suffer appreciable damage and the potential exists for the possible loss of a few lives in the event of dam failure. The depth of inundation at the buildings would be 0 feet before and 0.5 to 2 feet after dam failure.

e. Ownership:

Stub Pond Dam is presently owned by Avon Parks Property, P.O. Box 354, Farmington, Connecticut 06032. Telephone: (203) 677-1361. The previous owner was the Ensign-Bickford Company and the Avon Water Company previously had water rights to the pond.

f. Operator:

This person in charge of maintenance of the dam is:

Mr. Ray Greenwood
Maintenance Supervisor
F.I.P. Corporation
P.O. Box 354
Farmington, CT 06032
Telephone: (203) 677-1361

g. Purpose:

Originally used for industrial and municipal water supply, Stub Pond is presently utilized for passive recreation and aesthetics.

h. Design and Construction History:

The dam has existed at least since 1918 when it was modified to accommodate the addition of various water supply appurtenances.

i. Normal Operational Procedures:

There are presently no operational procedures and all flow is discharged over the spillway.

1.3 Pertinent Data:

a. Drainage Area:

The Stub Pond Dam drainage basin is generally rectangular in shape with a length of 3.9 miles and an average width of 1.5 miles, resulting in a total drainage area of 5.8 square miles (see drainage basin map in Appendix D). The topography is generally a moderate to steep terrain, with elevations ranging from a high of 900

feet to a low of 231.5 feet at the spillway crest (top of flashboards). Stream and basin slopes are flat to steep, 0.2 percent to 10 percent, respectively. The normal surface area of the pond is 11.5 acres which is approximately 0.3 percent of the watershed.

b. **Discharge at Dam Site:**

There are no specific discharge records available for this dam. Listed below are calculated discharge values for the spillway, with the flashboards in place.

1. Outlet works: There is insufficient data available to determine discharge capacities for the outlet works.

2. Maximum known discharge at dam site: Unknown. Reportedly there was up to one foot of flow over the earth embankment portion of the dam in January 1979.

3. Ungated spillway capacity at top of dam: 53 cfs at elevation 232.1.

4. Ungated spillway capacity at test flood elevation: 240 cfs at elevation 223.1.

5. Gated spillway capacity at normal pool elevation: N/A

6. Gated spillway capacity at test flood elevation: N/A

7. Total spillway capacity at test flood elevation: 240 cfs at elevation 233.1.

8. Total project discharge at top of dam: 53 cfs at elevation 232.1.

9. Total project discharge at test flood elevation: 1800 cfs at elevation 233.1.

c. **Elevation (Feet Above NGVD):**

1.	Stream Bed at toe of dam	225+
2.	Bottom of cutoff	Unknown
3.	Maximum tailwater	Unknown
4.	Normal Pool	231.5
5.	Full flood control pool	N/A
6.	Spillway crest	231.5 (Top of Flashboards) 230.3 (Concrete Spillway)

7.	Design surcharge	Unknown
8.	Top of dam	232.1
9.	Test flood level	233.1

d. **Reservoir (Length in Feet):**

1.	Normal pool	2300
2.	Flood control pool	N/A
3.	Spillway crest pool	2300 (Top of Flashboards)
4.	Top of dam	2800
5.	Test flood pool	3400

e. **Storage (acre-feet):**

1.	Normal pool	23
2.	Flood control pool	N/A
3.	Spillway crest pool	23 (Top of Flashboards)
4.	Top of dam	35
5.	Test flood pool	47

f. **Reservoir Surface (acres):**

1.	Normal pool	11.5
2.	Flood control pool	N/A
3.	Spillway crest	11.5 (Top of Flashboards)
4.	Test flood pool	19.9
5.	Top of dam	12.0

g.	**Dam:**	
	1. Type	Earth embankment and concrete wall
	2. Length	500 feet - earth embankment 64 feet - concrete wall
	3. Height	6.7 feet
	4. Top width	8 feet
	5. Side slopes	2H:1V (Downstream) Unknown (Upstream)
	6. Zoning	Unknown
	7. Impervious Core	Unknown
	8. Cutoff	Unknown
	9. Grout curtain	Unknown
	10. Other	N/A
h.	**Diversion and Regulating Tunnel:**	N/A
i.	**Spillway:**	
	1. Type:	Overflow, uncontrolled weir
	2. Length of weir	40 feet
	3. Crest elevation	231.5 (Top of Flashboards) 230.3 (Concrete Spillway)
	4. Gates	None
	5. U/S Channel	Pond
	6. D/S Channel	Existing Stream
	7. General	15 inches flashboard

j. **Regulating Outlets:**

Refer to Paragraph 1.2b - "Description of Dam and Appurtenances" for description of Outlet Works.

		6 INCH PIPE	36 INCH PIPE	BLOWOFF
1.	Invert	Unknown	Unknown	Unknown
2.	Size	6 Inch	36 Inch	Unknown
3.	Description	Unknown	Unknown	Unknown
4.	Control mechanism	Gate Valve	Unknown	Unknown
5.	Other	Operability is Unknown	Operability is Unknown	Operability is Unknown

SECTION 2

ENGINEERING DATA

2.1 Design

There are no available records presenting design information for the construction of Stub Pond Dam.

2.2 Construction

There are no available records of the construction or subsequent repairs to this dam.

2.3 Operation

No formal records of operation are maintained for this facility.

2.4 Evaluation

a. Availability:

The information concerning this dam was gathered only by field investigation and meetings with representatives of the owners.

b. Adequacy:

The lack of indepth engineering data did not allow a definite review. Therefore, the adequacy of this dam could not be assessed from the standpoint of reviewing design and construction data, but is based primarily on the visual inspection, the dam's past performance, and sound engineering judgment.

c. Validity:

The validity of the limited information available could not be verified.

SECTION 3

VISUAL INSPECTION

3.1 Findings

a. General:

The visual inspection of Stub Pond Dam was conducted on November 14, 1980 and a copy of the visual inspection check list is contained in Appendix A of this report.

The following procedure was used:

1. Inspection of the upstream area of the reservoir which was impounded by the dam.

2. Visual inspection of the face and top of the dam and spillway for cracks, settlement, seepage, etc.

3. Inspection of the outlet works and other appurtenances as to their existance, location, and operability.

4. Review of procedures that could be utilized in the event of an emergency situation.

5. A check of the downstream area for seepage, piping, boils or other indications of abnormal conditions. The downstream hazard potential in the event of dam failure was investigated.

6. Photographs of the general area of the dam and of specific items of note were taken and are included in Appendix C of this report.

Before the inspection, the available existing data was studied and reviewed.

b. Dam:

1. Crest: The dam consists of an earth embankment with a top width of approximately 8 feet and a maximum height of 6.7 feet (Photos C-8, C-9). There is a footpath along the top of the dam and there are many exposed tree roots however, there does not appear to be any serious erosion.

2. Upstream Face: The upstream face of the dam is an earth slope which was mostly underwater and out of view. There is presently 0.6 feet between the top of the flashboards and the top of the concrete wall. The earth embankment is 0.5 to 1.0 feet higher then the top of this concrete wall. There are, trees, shrubs, and grass growing on the portion of the slope above the pond (Photos C-8, C-9).

3. Downstream Face: The downstream face is an earth embankment with a slope of approximately 2H:1V. There are numerous large (24 to 36 inch diameter) pine trees growing on the downstream face (Photos C-8, C-9). There is clear standing water all along the toe of the dam to the east of the spillway and the toe is damp to the west of the spillway. It could not be determined if the water and dampness was due to seepage or ground/surface water. The standing water along the toe to the east of the spillway drains to a small culvert under a gravel road where it was measured at from 1/4 to 1/2 gallons per minute (See Plan Page B-8).

4. Concrete Wall: The area immediately downstream of the eastern wall is severly eroded (See Plan Page B-9) exposing much of the downstream face of the wall (Photo C-3). This wall is severely cracked and spalled with grass growing in the cracks (Photo C-4). The cracks extend from the spillway approximately 45 feet east. Approximately 1 to 2 gallons per minute of clear water is seeping through the wall (Photo C-4). The area below the western wall is also eroded (Photo C-6), and the wall is broken at the top of the eastern end with a large reinforcing bar exposed.

c. **Appurtenant Structures:**

1. Spillway: The concrete spillway is 40 foot long and has 15 inch high permanently attached timber flashboards which appear in sound condition (Photos C-1, C-3, C-5). Considerable debris was caught on the spillway at the western end. Water was flowing over the entire spillway on the day of the inspection. The concrete spillway wingwalls are also cracked at the base where they joint the spillway.

2. Gate House: The timber gate house is located at the eastern end of the dam (Photo C-9, C-10). The exterior of the house is in fair condition. There is a vent for the 36 inch pipe just east of the house, and no flow was observed in the pipe. The house was locked and the interior and control mechanism could not be inspected. The representative of the owner indicated that the key to the lock on the gate house could not be located.

3. Blowoff:There is a blowoff through the eastern concrete wall approximately 11.6 feet east of the spillway. The control mechanism could not be seen beacuse it is underwater and its operability is unknown. The blowoff outlets through a concrete arched opening below the wall (Photo C-7).

4. 6 Inch Pipe: The downstream gate valve for this pipe was visible. No other portions of the system could be observed. A 6 inch C.I. pipe with flap gate was noticed in a ditch to the east of the gate house. It is possible that this is the same pipe.

d. Reservoir Area:

The area around the eastern end of the dam is relatively flat and is utilized by a fish and game club for passive recreation. The area around the western end of the dam is bordered by relatively steep forested slopes. No geologic features were noted that could be expected to adversely affect the dam or appurtenances.

e. Downstream Channel:

Debris has formed a small dam (1 foot high) immediately downstream of the spillway (Photo C-1). The channel beyond is an existing stream through the woods, relatively free of debris, with trees growing along the edges.

3.2 Evaluation:

Based on the visual inspection, Stub Pond Dam appears to be in poor condition overall. Specific areas of concern that were noted are:

a. The trees and brush growing on the embankment.

b. The erosion downstream of the concrete walls.

c. The cracks, spalling, and seepage through the concrete wall.

d. The possible seepage through the earth embankment.

e. The lack of an operable low level outlet.

f. The inadequate spillway capacity.

SECTION 4

OPERATIONAL AND MAINTENANCE PROCEDURES

4.1 Operational Procedures

a. General:

There are presently no operational procedures for Stub Pond Dam. It has only a recreational purpose at this time.

b. Description of Any Warning System in Effect:

No formal emergency or contingency plan is in effect to reduce or minimize downstream damage.

4.2 Maintenance Procedures

a. General:

There is no regular maintenance schedule for the dam. Maintenance is reportedly on an "as need" basis. Visual inspections by the owner are performed periodically.

b. Operating Facilities:

There is no regular maintenance of the spillway or outlet works.

4.3 Evaluation

To insure the safety of the resident downstream, a regular inspection and maintenance program and a formal downstream warning plan should be developed and implemented.

SECTION 5

EVALUATION OF HYDRAULIC/HYDROLOGIC FEATURES

5.1 General

Stub Pond Dam creates an impoundment with a total storage capacity of 23 ac.-ft. at elevation 231.5, the top of flashboard elevation. Each foot of depth in the reservoir above the top of flashboards can accommodate approximately 11.5 ac.-ft. The drainage area is 5.8 square miles and the normal pond area is 11.5 acres or 0.3 percent of the watershed. The spillway is 40 feet long with 15 inches of flashboards and is 0.6 feet below the top of the concrete wall.

5.2 Design Data

a. No specific design data is available for this watershed or the structures of Stub Pond Dam. In lieu of existing design information, USGS topographic maps (scale 1"=2000') were utilized to develop hydrologic parameters such as drainage area, basin length, time of concentration, and other runoff characteristics. Elevation-storage relations for Stub Pond Dam were approximated. The pond surface area and surcharge storage was computed using the USGS maps. Some of the pertinent hydraulic design data was obtained and/or confirmed by actual field measurements at the time of the visual inspection.

b. Outflow values (routing procedures) and dam overtopping analyses were computed in accordance with the guidelines developed by the Corps of Engineers. Judgment was used in calculating final values outlined in this report, which are quite approximate and should not be considered a substitute for actual detailed analysis.

5.3 Experience Data

Historical data for recorded discharges is not available for this dam. Reportedly the earth embankment was overtopped in January, 1979 by approximately 1 foot.

5.4 Test Flood Analysis

Recommended Guidelines for the Safety Inspection of Dams by the Corps of Engineers were used for the selection of the "Test Flood". This dam is classified as a SIGNIFICANT hazard and SMALL size structure. Guidelines indicated that a range of the 100 year to 1/2 the Probable Maximum Flood (PMF) be used as the "Test Flood" for these classifications. A test flood of 100 years was chosen because of the size of the dam. The watershed has a total area of 5.8 square miles. Snyder's lag was calculated to be 5.5 hours and a Snyder peaking coefficient of 0.625 was used. The 200 square mile - 24 hour probable maximum precipitation (PMP) is 21.5 inches. The flood

hydrograph package, HEC-1 computer program, developed by the Corps of Engineers was utilized to develop the inflow hydrograph, route the flood through the reservoir, and for the dam overtopping analysis. The 1/4 PMF, which is comparable to the 100 year flood, has been used for the test flood. The test flood inflow was calculated to be 1810 cfs (310 csm), the 1/2 PMF inflow is 3600 cfs (620 csm) and the PMF inflow is 7200 cfs (1250 csm). The outlet works were assumed to be closed and the flashboards were in place for this analysis.

The spillway capacity is hydraulically inadequate to pass the "Test Flood" and overtopping of the dam will occur. The maximum outflow capacity of the spillway without overtopping the dam is 53 cfs. This corresponds to 3 percent of the test flood outflow. The maximum outflow discharge value for the test flood is 1800 cfs corresponding to a depth of flow over the top of the dam of 1.0 foot. A spillway rating curve, and a reservoir stage capacity curve are included in Appendix D of this report.

5.5 Dam Failure Analysis

This dam is classified as SIGNIFICANT hazard structure. Failure discharge could cause the loss of a few lives and damage seven buildings along the downstream channel.

The calculated dam failure discharge is 4400 cfs due to an assumed breach width of 150 feet and a pre-failure pool level equal to the top of the dam. At this elevation, the downstream discharge before failure will be the full spillway capacity of 53 cfs corresponding to a depth of flow of 1-2 feet in the downstream channel. No buildings would be inundated by this pre-failure flow. Failure will produce a water surface level of approximately 6.7 feet immediately downstream from the dam. Five buildings may be inundated by from 0.5 to 1.0 feet and two buildings may be inundated by 2.0 feet above ground level. The failure discharge will effect downstream areas for a distahce of 8000 feet from the dam. At this distance, the water surface level will be approximately 0 - 1 foot above normal observations as it enters the Farmington River. Beyond 8000 feet, the effects of the failure discharge will be reduced as it enters the Farmington River. Water surface elevations due to the failure of the dam are listed on page D-21. Probable consequences including the prime impact areas are listed on page D-27.

SECTION 6

EVALUATION OF STRUCTURAL STABILITY

6.1 Visual Observation

The most significant area of distress noted for this dam was the severe erosion downstream of the eastern concrete wall. This erosion is apparently caused by water flowing over the top of the wall and then parallel to the wall to the downstream channel.

This wall is severely cracked and seepage is occurring through most of the cracks. The condition of the upstream face of the dam could not be determined due to the pond level. It is possible that the seepage and cracks are occurring and/or enhanced by unknown defects in the upstream face of the dam.

Other areas of concern were the very large trees and root systems along the top of the earth embankment and the possible seepage all along the toe of the embankment.

6.2 Design and Construction Data

There is insufficient design and construction data to permit a formal evaluation of stability.

6.3 Post-Construction Changes

The dam is believed to have remained essentially unchanged since at least 1918.

6.4 Seismic Stability

The dam is in Seismic Zone 1 and hence does not require evaluation for seismic stability according to the Corps of Engineers Recommended Guidelines.

SECTION 7

ASSESSMENT, RECOMMENDATIONS AND REMEDIAL MEASURES

7.1 Dam Assessment

a. Condition:

Based on the visual inspection, past performance, and hydraulic/ hydrologic evaluation, Stub Pond Dam and appurtenances are judged to be generally in POOR condition. Items of concern that should be addressed as a result of this inspection are listed in Sections 7.2 and 7.3.

b. Adequacy:

The information available is such that the assessment of the safety of the dam should be based on the visual inspection results and the past operational performance of this structure.

c. Urgency:

The recommendations and remedial measures described below should be implemented by the owner within one year after receipt of this Phase I Inspection Report except as noted.

7.2 Recommendations

It is recommended that the owner engage a qualified registered engineer to carry out the following actions and that his recommendations be implemented.

a. All trees and their respective root systems be removed from the dam and within 15 feet of the downstream toe, and backfill with suitable compacted material.

b. An analysis of the structural integrity of the broken and cracked concrete walls and concrete wingwalls be conducted and repairs designed as required.

c. Investigate the upstream face of the embankment and concrete walls with the pond lowered and make appropriate recommendations.

d. The eroded areas downstream of the concrete walls be filled and erosion control be provided.

e. A detailed hydrologic/hydraulic investigation to determine the need for and the means of increasing the discharge capacity of the spillway and/or providing additional freeboard.

f. Determine the operability of the outlet works and provide a low level outlet if the existing 36 inch pipe or blowoff cannot be utilized.

g. Investigate the seepage along the toe and, if required, provide corrective measures.

7.3 Remedial Measures

1. **Operation and Maintenance Procedures:**

    1. Remove brush from the dam.

    2. Clear the debris from the downstream channel immediately below the dam and from the spillway.

    3. Develop a surveillance and downstream warning plan, including round-the-clock monitoring during heavy precipitation.

    4. Institute a program of annual periodic technical inspection.

    5. Immediately remove the flashboards and keep them removed until all of the recommendations and remedial measures have been completed.

7.4 Alternatives

There are no practical alternatives to the above stated recommendations.

APPENDIX A

INSPECTION CHECK LIST

INSPECTION CHECK LIST

PARTY ORGANIZATION

PROJECT Stub Pond Dam

DATE November 14, 1980

TIME 1:00 - 4:00 p.m.

WEATHER Overcast

W.S. ELEV. _____ U.S. ____ DN.S.

PARTY:

1. R. Johnston, JPPA
2. J. Hewes, JPPA
3. J. Walsh, Baystate Environmental Consultants, Inc.
4. _____
5. _____
6. R. Stevens, F.I.P., Corp.
7. _____
8. _____
9. _____
10. _____

	PROJECT FEATURE	INSPECTED BY	REMARKS
1.	Hydraulics	R. Johnston	
2.	Structural	J. Hewes	
3.	Geotechnical	J. Walsh	
4.			
5.			
6.			
7.			
8.			
9.			
10.			

INSPECTION CHECK LIST

PROJECT Stub Pond Dam DATE November 14, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
DAM EMBANKMENT	
Crest Elevation 232.1	Good footpath along crest
Current Pool Elevation 231.5	Top of flashboards
Maximum Impoundment to Date	Unknown
Surface Cracks	None observed
Pavement Condition	N/A
Movement or Settlement of Crest	Minor due to footpath
Lateral Movement	None observed
Vertical Alignment	Good
Horizontal Alignment	Good
Condition at Abutment and at Concrete Structures	Severe cracking and spalling of concrete wall east of spillway
Indications of Movement of Structural Items on Slopes	None observed
Trespassing on Slopes Vegetation on Slopes Sloughing or Erosion of Slopes or Abutments	Yes. Footpath along crest. Yes. Large trees and brush. Severe erosion downstream of east concrete wall.
Rock Slope Protection - Riprap Failures	N/A
Unusual Movement or Cracking at or near Toes	None observed
Unusual Embankment or Downstream Seepage	Wet area all along downstream toe. Seepage through concrete wall.
Piping or Boils	None observed
Foundation Drainage Features	Unknown
Toe Drains	Unknown
Instrumentation System	None observed

INSPECTION CHECK LIST

PROJECT Stub Pond Dam DATE November 14, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
Outlet works - intake channel and intake structure.	
a. Approach Channel	Entire pond bed - underwater
b. Intake structures	
Blowoff	Unknown
6 inch pipe	Gate valve
36 inch pipe	Metal bar rack at gate house.

INSPECTION CHECK LIST

PROJECT Stub Pond Dam DATE November 14, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
Outlet Works - Transition and conduit	
Blowoff	Unknown
6 inch pipe	Controlled by gate valves on upstream and downstream side of dam. Condition and operability unknown. Pipe is part of abandoned municipal water supply system.
36 inch pipe	Control is assumed to be in locked timber gate house. Pipe is part of abandoned industrial water supply system.

INSPECTION CHECK LIST

PROJECT Stub Pond Dam DATE November 14, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
Outlet Works - Outlet structure and outlet channel	
Blowoff	Arched opening below east concrete wall.
6 inch pipe	Unknown. Part of abandoned water supply system. Possibly, outlet is at ditch to the east of the gate house where a 6 inch C.I. pipe with flap gate was noticed.
36 inch pipe	Unknown. Suspected to be buried at upper end of ditch to east of gate house.

INSPECTION CHECK LIST

PROJECT Stud Pond Dam DATE November 14, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - CONTROL TOWER	Interior was locked and not inspected.
a. Concrete and Timber	
General Condition	Concrete, good. Timber, fair.
Condition of Joints	N/A
Spalling	None observed
Visible Reinforcing	None observed
Rusting or Staining of Concrete	None observed
Any Seepage or Efflorescence	None observed
Joint Alignment	N/A
Unusual Seepage or Leaks in Gate Chamber	Unknown
Cracks	None observed
Rusting or Corrosion of Steel	Bar rack rusted
b. Mechanical and Electrical	
Air Vents	Unknown
Float Wells	Unknown
Crane Hoist	Unknown
Elevator	Unknown
Hydraulic System	Unknown
Service Gates	Unknown
Emergency Gates	Unknown
Lightning Protection System	None observed
Emergency Power System	None observed
Wiring and Lighting System in Gate Chamber	Unknown

INSPECTION CHECK LIST

PROJECT Stub Pond Dam DATE November 14, 1980

PROJECT FEATURE _____ NAME _____

DISCIPLINE _____ NAME _____

AREA EVALUATED	CONDITION
OUTLET WORKS - SPILLWAY WEIR, APPROACH AND DISCHARGE CHANNELS	
a. Approach Channel	Pond Bed - Under water
General Condition	Under water
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	Yes
Floor of Approach Channel	Under water
b. Weir and Training Walls	
General Condition of Concrete	Poor - cracked and broken
Rust or Staining	None observed
Spalling	Yes
Any Visible Reinforcing	Yes. At top of east end of west concrete wall.
Any Seepage or Efflorescence	Yes. Through cracked wall.
Drain Holes	None observed
c. Discharge Channel	
General Condition	Fair
Loose Rock Overhanging Channel	None observed
Trees Overhanging Channel	Yes
Floor of Channel	Natural - Gravel
Other Obstructions	Debris Dam - 1 foot high

APPENDIX B

ENGINEERING DATA

APPENDIX B-1

DESIGN, CONSTRUCTION AND MAINTENANCE RECORDS

Location	Items
Mr. Victor J. Galgowski Dam Safety Engineer Water Resources Unit Department of Environmental Protection State of Connecticut State Office Building Hartford, Connecticut 06115	• 1. State Inspection Reports 2. State Order to Repair Dam
Avon Water Company 176 West Main Street *Avon, Connecticut 06001*	1. Map Showing Water Lines in Dam Area 2. 1918 Photograph of Dam

• Indicates material contained in this Phase I Inspection Report.

APPENDIX B-2

COPIES OF PAST INSPECTION REPORTS

LUCHS & BECKERMAN
CIVIL ENGINEERS • PLANNERS • LAND SURVEYORS

GLASTONBURY, CONN. 06033
12 NATIONAL DRIVE
PHONE 633 9401

PROVIDENCE, R. I. 02903
169 WEYBOSSET STREET
PHONE 421-0420

EAST LONGMEADOW, MASS. 01028
45 BAYMOR DRIVE
PHONE 525-6537

PARTNERS
JOHN LUCHS JR
STUART J BECKERMAN

REPLY TO Glastonbury

May 23, 1978

WATER RESOURCES
UNIT
RECEIVED
MAY 26 1978

ANSWERED _____
REFERRED _____
FILED _____

Victor F. Galgowski
Superintendent of Dam Maintenance
Water Resources Unit
State of Connecticut
Department of Environmental Protection
State Office Building
Hartford, CT 06115

Re: Stub Pond Dam - Avon
Our File # 57-73-121

Dear Mr. Galgowski:

Per your letter request of 28 November 1977 Mr. Robert McCabe and the writer visited the site on April 12, 1978. I had one of my employees, a resident of Avon, check the site occasionally and it was not practical to visit it earlier due to the persistent snow cover.

The following is what we found in the field and from our office calculations:

1. Type of structure - Earthen embankment, concrete spillway and concrete cap on old concrete and stone.

2. Concrete spillway - 40' ± x 1.8' with 1.1' weir boards the length of spillway.

3. Freeboard - With weir boards in place, 0.7' for concrete cap and 1' ± for earth embankment.

4. Flows - With weir boards in place, a flow of 200± cfs will overtop the concrete cap. (This happens frequently as evidenced by the downstream scour easterly of the spillway.) With the boards removed, overtopping will occur at 450± cfs. The 100 year flow is 1400± cfs.

5. Draw-down - There is a sluice through the wall east of the spillway.

Victor F. Galgowski
Superintendent of Dam Maintenance

Re: Stub Pond Dam
Our File #57-73-121

6. Recommendations:

1. Remove large trees from earth embankment.
2. Remove weir boards to provide greater spillway capacity.
3. Repair deteriorating concrete wall easterly of spillway.
4. Provide scour control immediately downstream of concrete capped section.
5. Raise earth embankment to provide 2' of freeboard above high water surface.

The drainage area (5.3± square miles) has been intensively developed since the construction of the dam and corrective work is mandated. Enclosed are five (5) sheets of photographs for your file.

If you have any questions, please call.

Very truly yours,

LUCHS & BECKERMAN, CIVIL ENGINEERS

John Luchs, Jr., P.E.

JLjr/ed

encl.

cc: file

CT 4,1

No. _____

Inventoried By _____

Date _____

WATER RESOURCES UNIT
SUPERVISION OF DAMS
INVENTORY DATA

Long: 72° 50.5'
Lat: 41° 48.6'

Name of Dam or Pond STUB POND DAM

Code No. _____

Nearest Street Location Route 44, Avon

Town Avon

U.S.G.S. Quad. Avon

Name of Stream Nod Brook

Owner Avon Parks Property

Address P.O. Box 354
Farmington, CT
Attn: Stanley Fisher

Pond Used For Recreation Drainage Area 5.3 sq. mi.

Dimensions of Pond: Width _____ Length _____ Area 10.2 ac.

Total Length of Dam 100' Length of Spillway 30'

Location of Spillway Center

Height of Pond Above Stream Bed 8'

Height of Embankment Above Spillway 1'

Type of Spillway Construction Concrete

Type of Dike Construction Concrete

Downstream Conditions Dirt road 1500';paved road 3000'

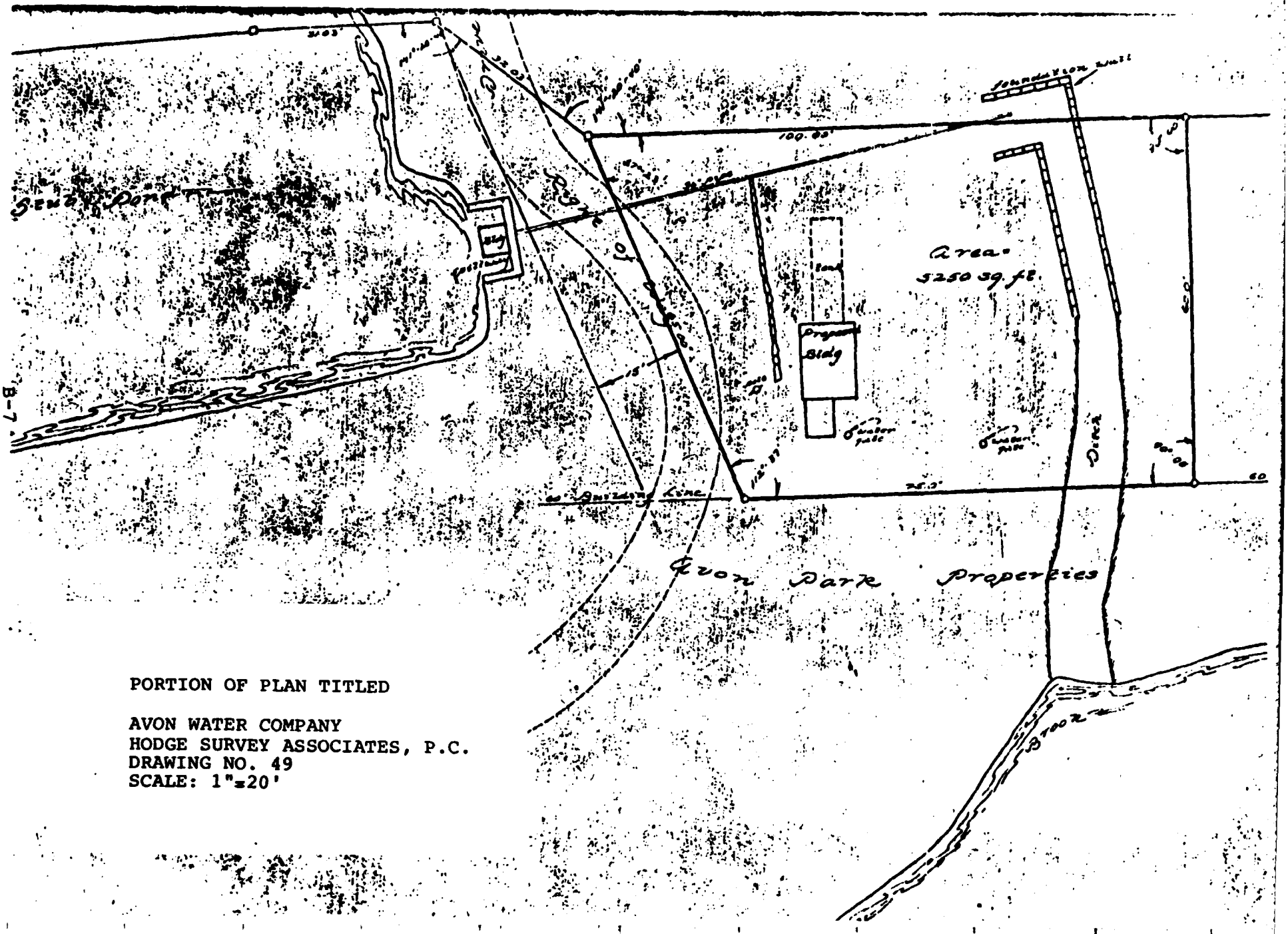
Summary of File Data _____

Remarks _____

Would Failure Cause Damage? Yes Class B

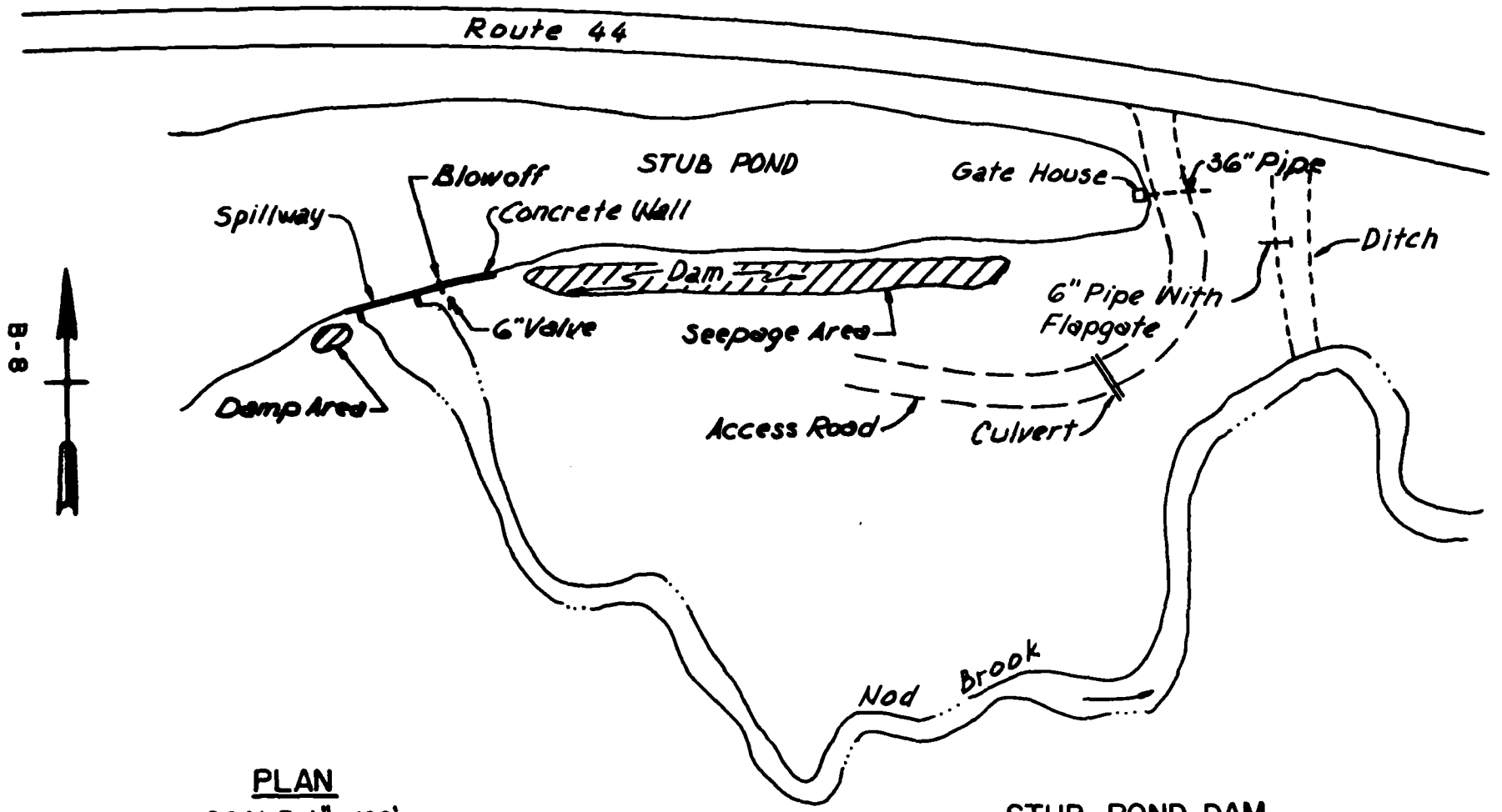
APPENDIX B-3

RECORD DRAWINGS AND SKETCHES



PORTION OF PLAN TITLED

AVON WATER COMPANY
HODGE SURVEY ASSOCIATES, P.C.
DRAWING NO. 49
SCALE: 1"=20'



PLAN

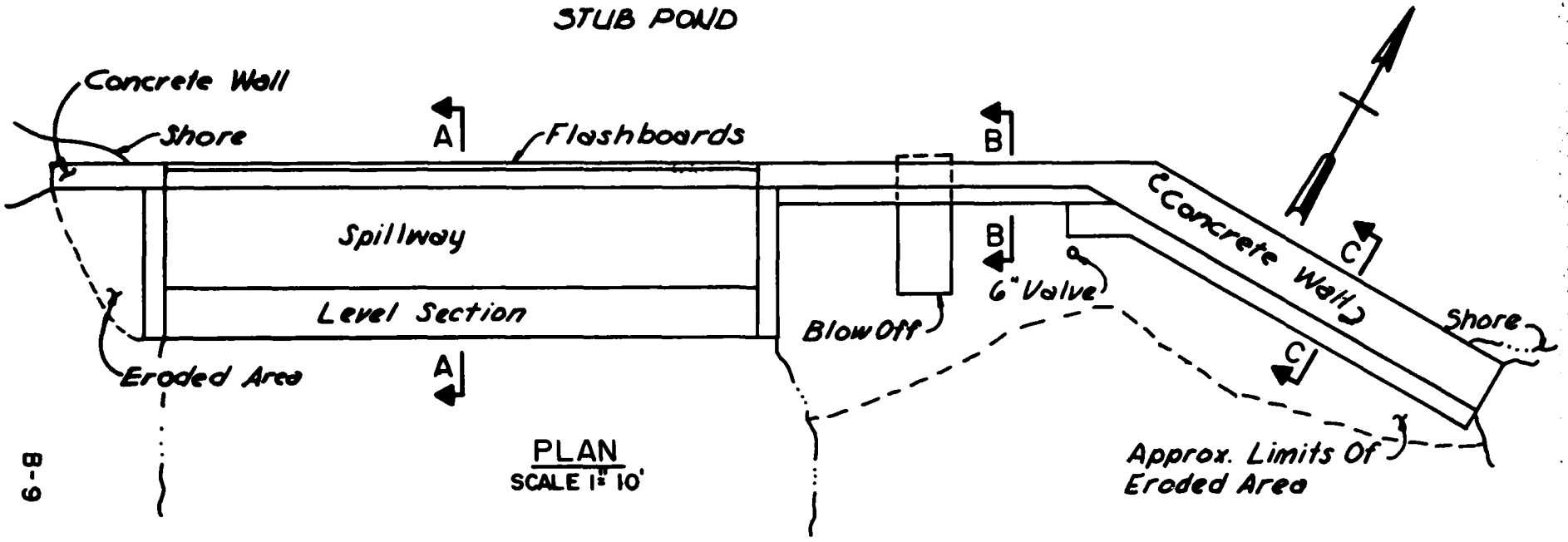
SCALE 1" = 100'

STUB POND DAM

JAMES P. PURCELL ASSOCIATES, INC.

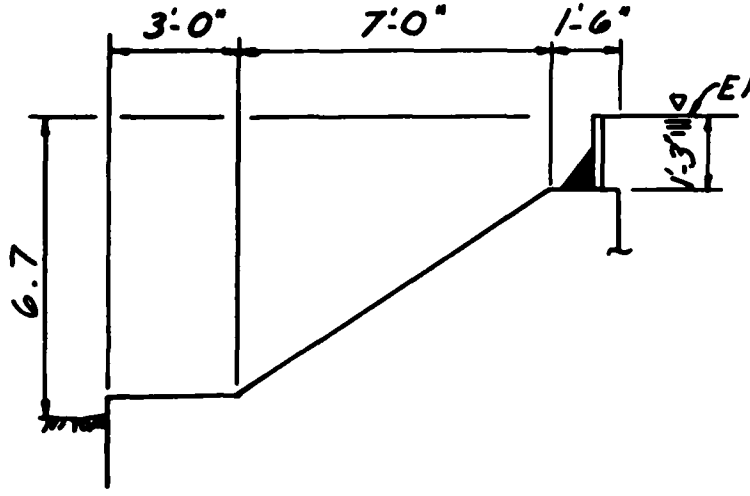
ENGINEERS • ARCHITECTS • PLANNERS

STUB POND

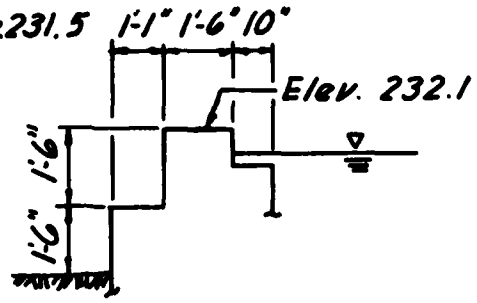


PLAN
SCALE 1" = 10'

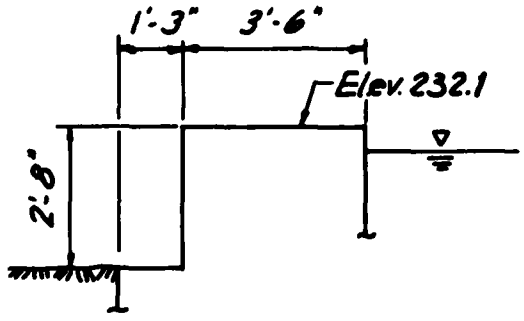
6-8



SECTION A-A
SCALE 1" = 40'



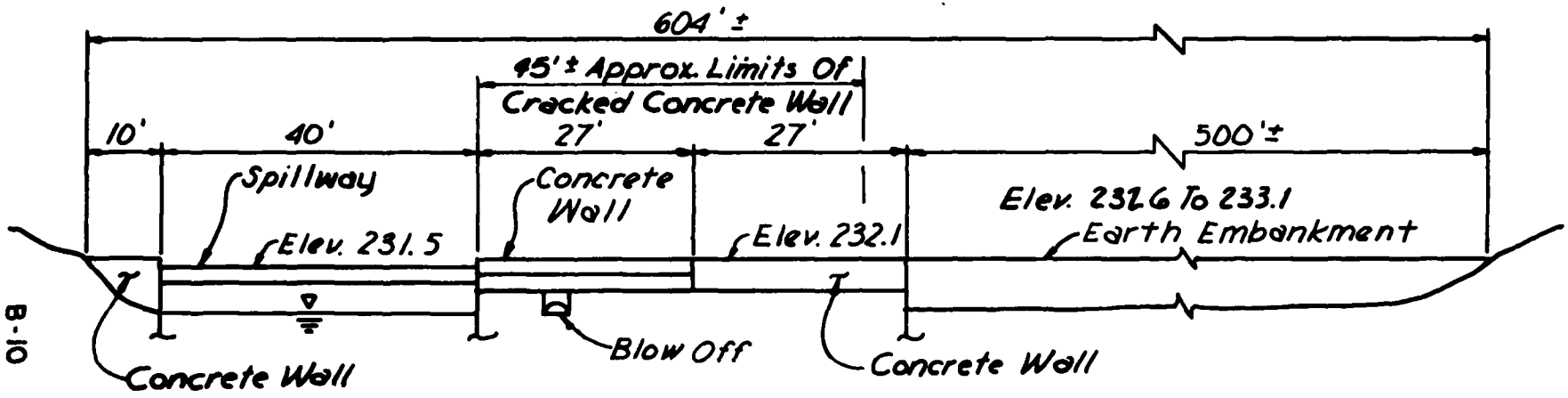
SECTION B-B
SCALE 1" = 40'



SECTION C-C
SCALE 1" = 40'

STUB POND DAM

JAMES P. PURCELL ASSOCIATES, INC.
ENGINEERS • ARCHITECTS • PLANNERS



ELEVATION OF DAM - LOOKING UPSTREAM

SCALE 1" = 20'

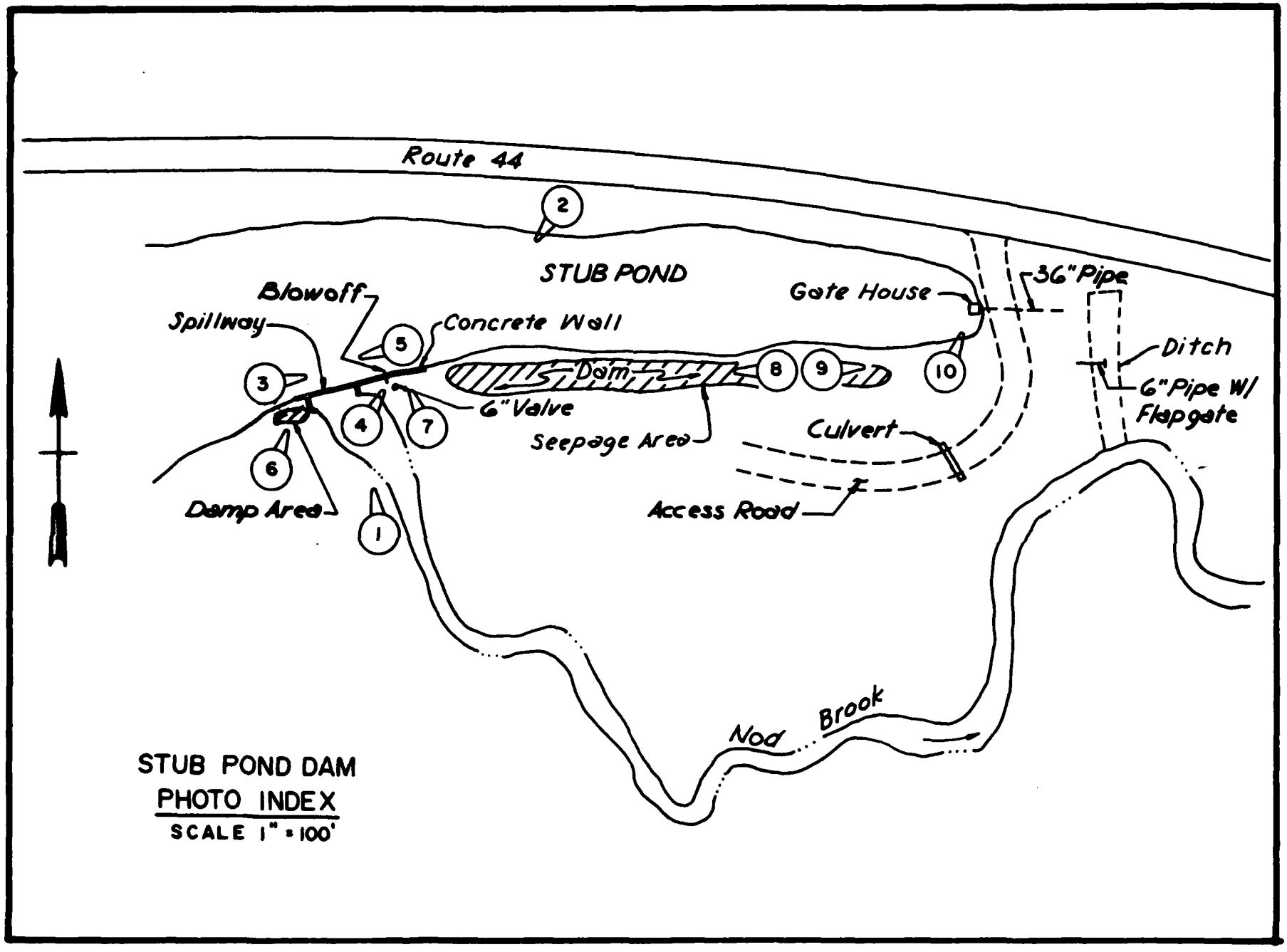
STUB POND DAM

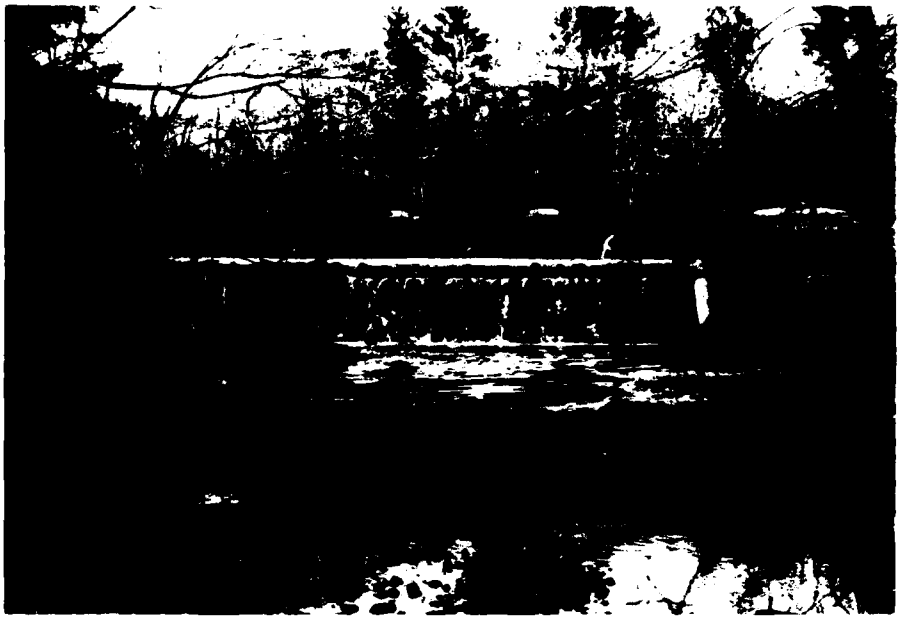
JAMES P. PURCELL ASSOCIATES, INC.

ENGINEERS • ARCHITECTS • PLANNERS

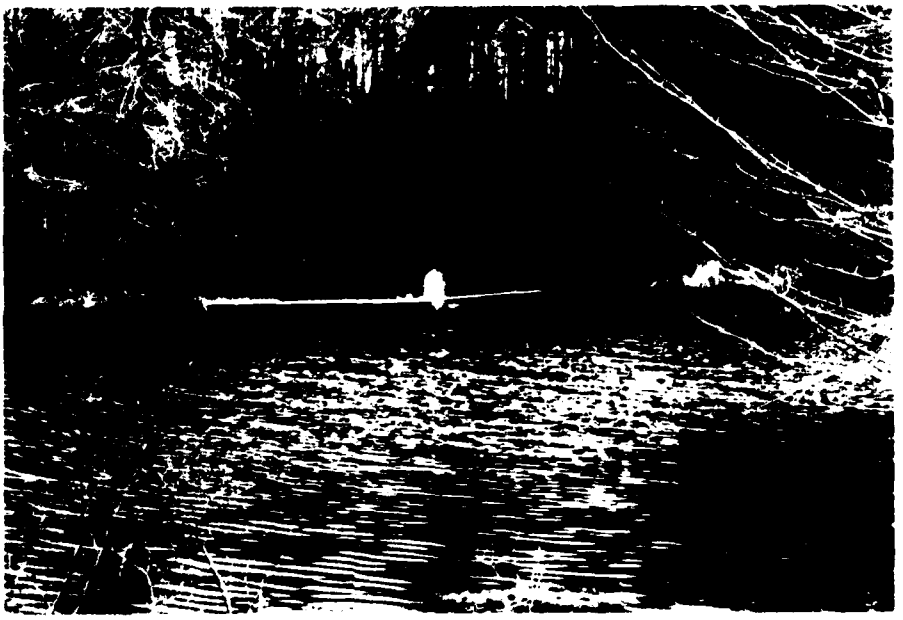
APPENDIX C

PHOTOGRAPHS

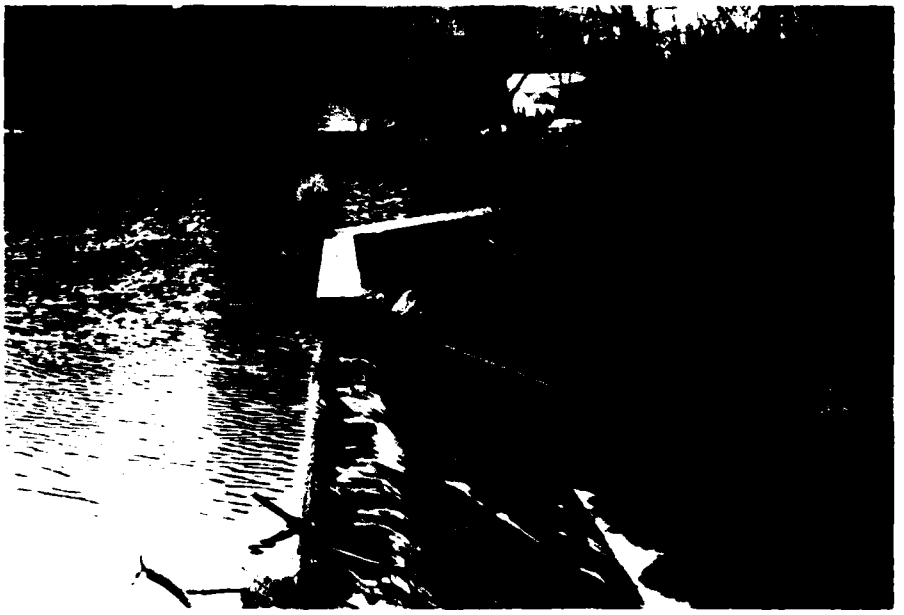

Route 44
2
STUB POND
Blowoff
Spillway
Concrete Wall
Gate House
36" Pipe
Ditch
6" Pipe W/ Flapgate
5
3
Dam
8
9
10
6" Valve
4
7
Seepage Area
Culvert
6
Damp Area
Access Road
1
Nod Brook
STUB POND DAM
PHOTO INDEX
SCALE 1" = 100'



C-1 SPILLWAY - LOOKING NORTH



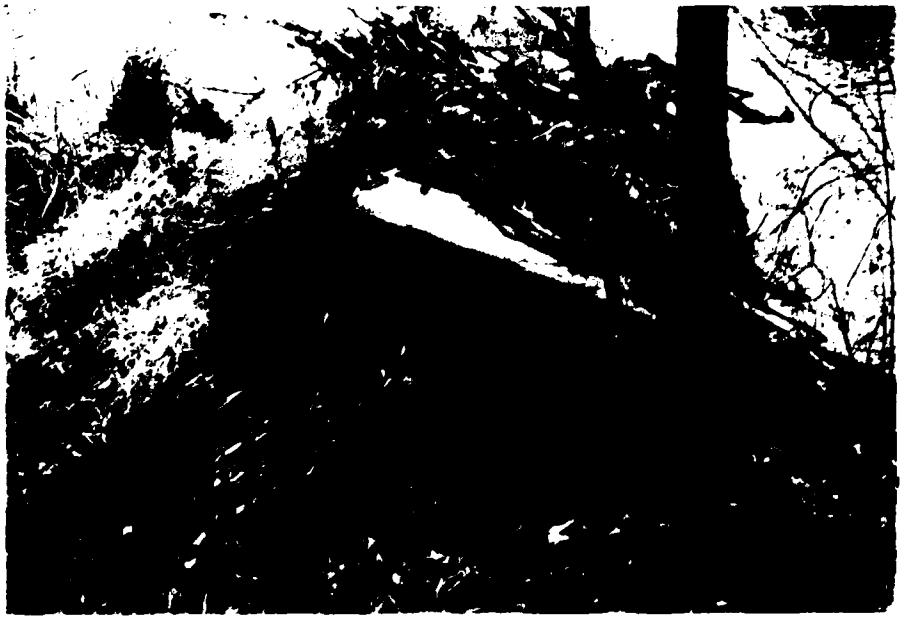
C-2 SPILLWAY - LOOKING SOUTH



C-3 EAST CONCRETE WALL - SHOWING ERODED AREA BELOW WALL

C-4 DOWNSTREAM FACE OF EAST CONCRETE WALL SHOWING CRACKS, EROSION AND SEEPAGE

C-5 WEST EMBANKMENT



C-6 ERODED AREA DOWNSTREAM OF WEST CONCRETE WALL

C-7 OUTLET OF BLOWOFF DOWNSTREAM OF EAST CONCRETE WALL

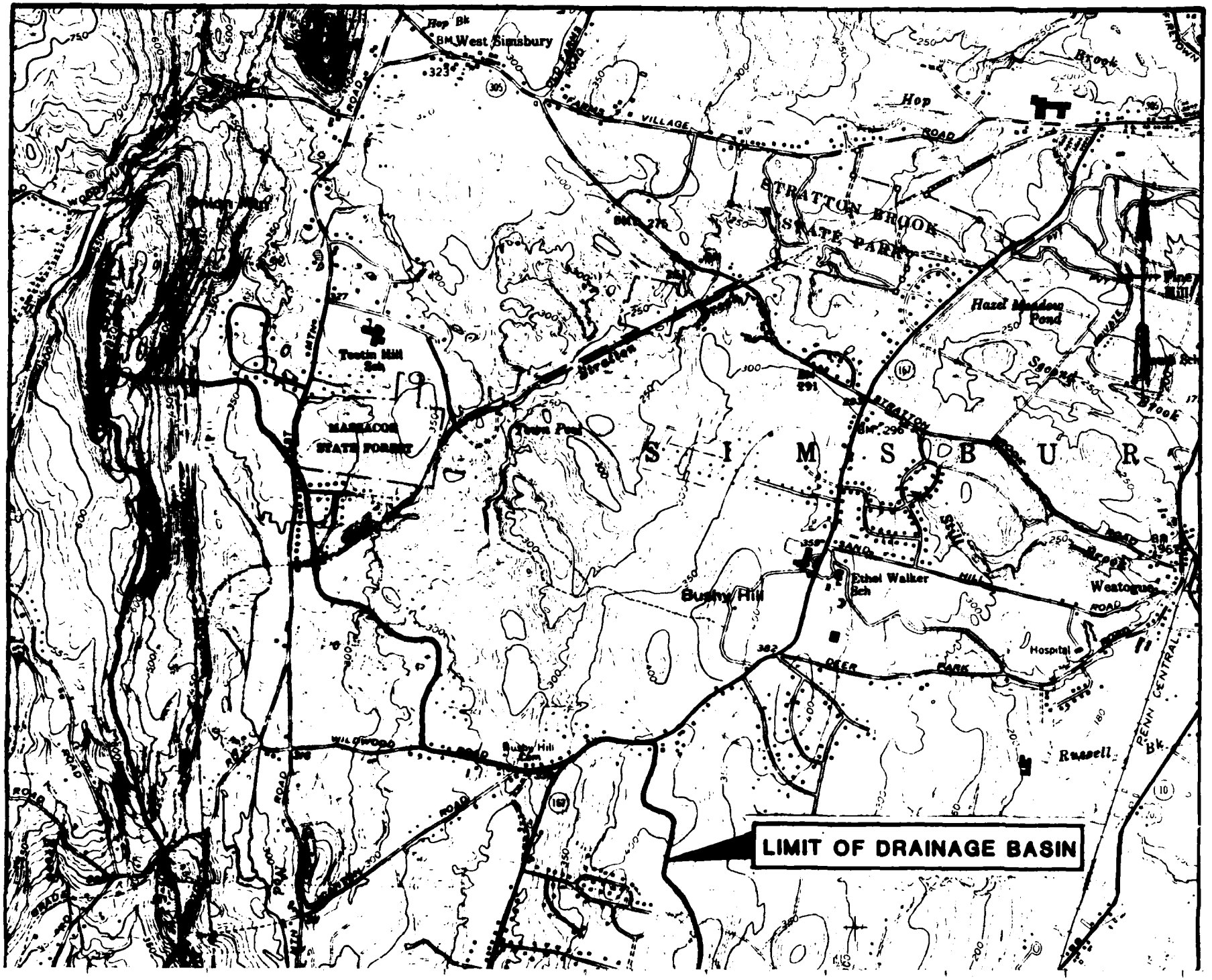
C-8 TOP OF EARTH DAM LOOKING WEST

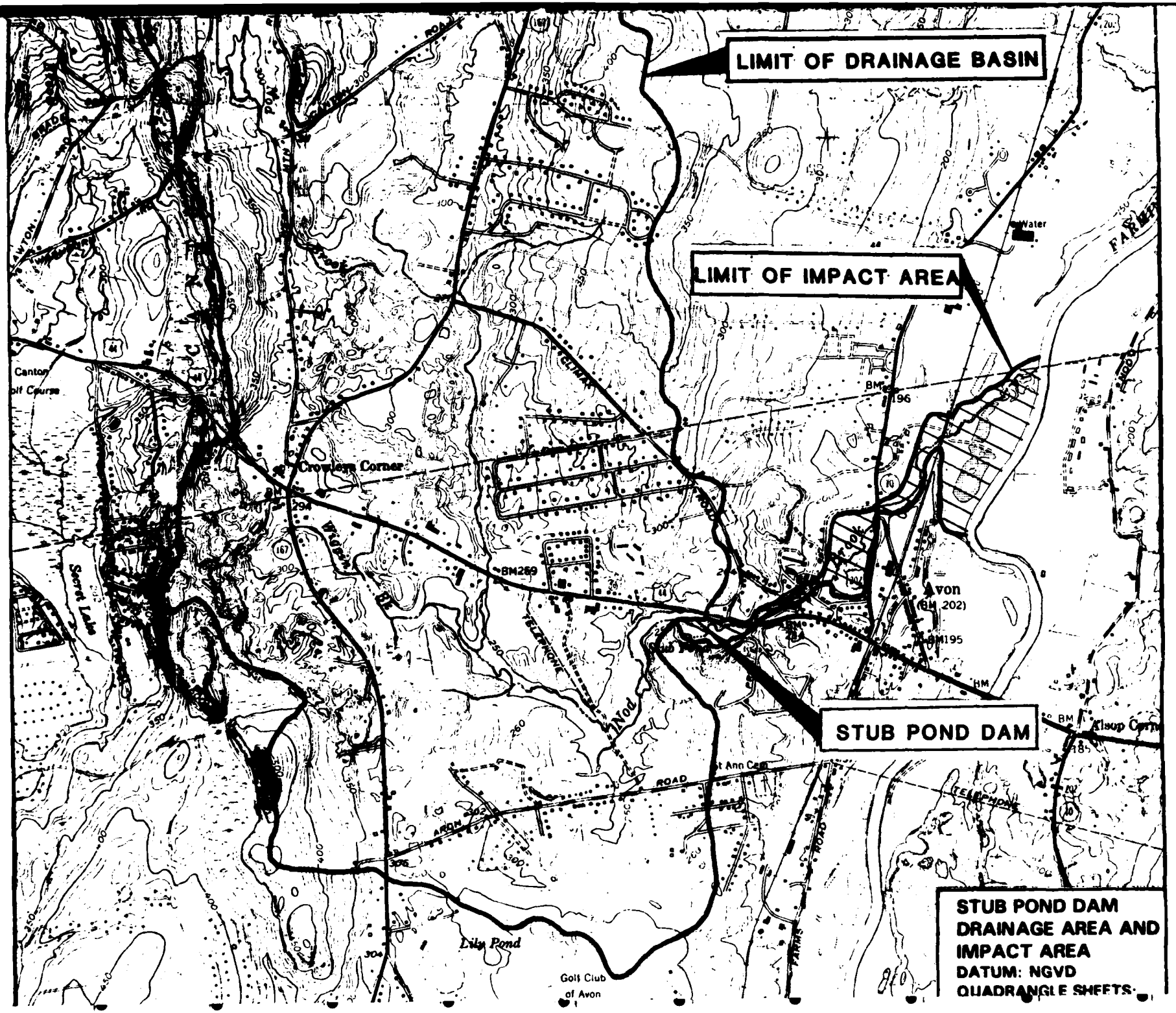
C-9 TOP OF EARTH DAM - LOOKING EAST

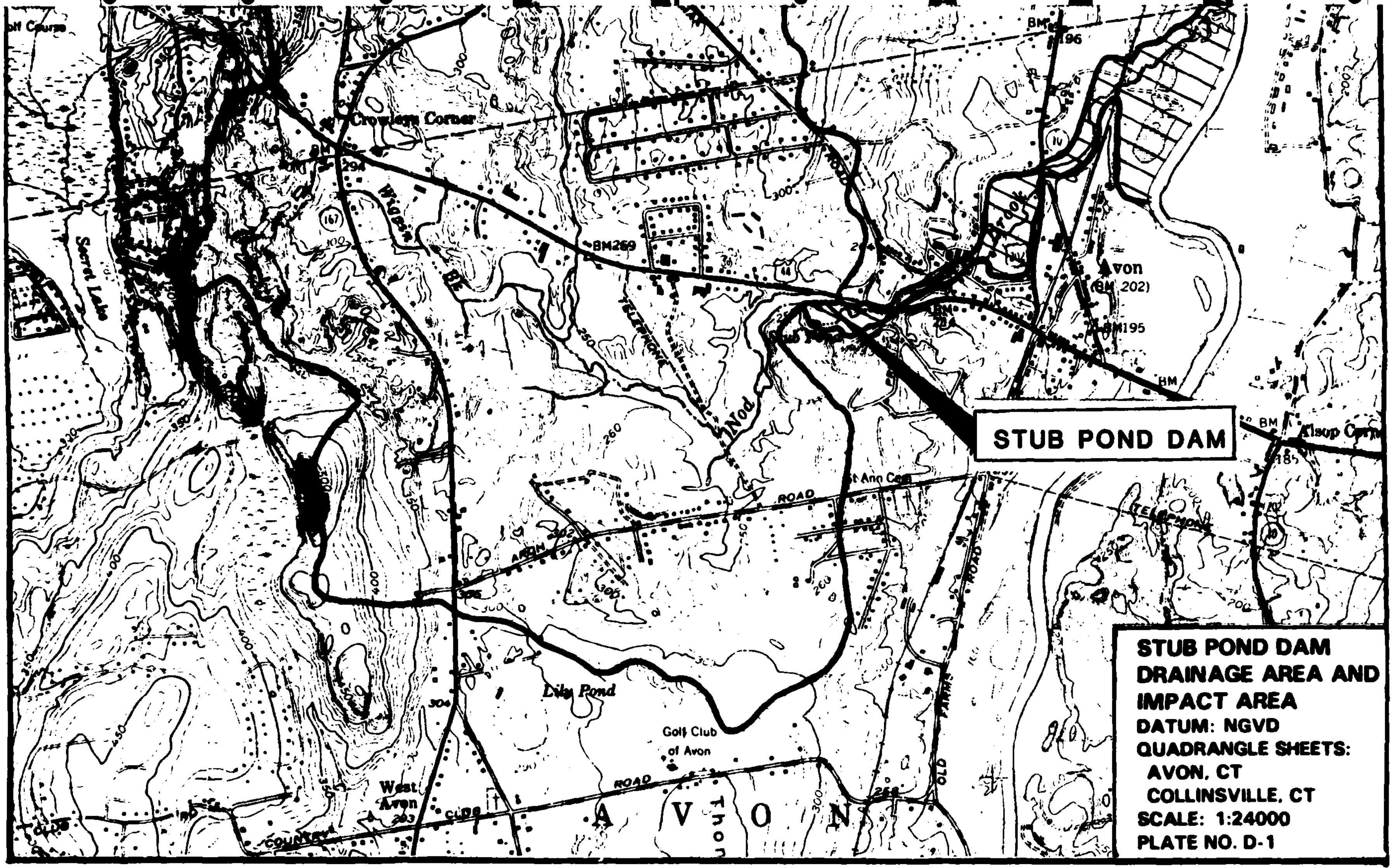
C-10 GATE HOUSE AT EAST END OF DAM - NOTE VENT TO RIGHT OF HOUSE.

APPENDIX D

HYDROLOGIC AND HYDRAULIC COMPUTATIONS


Hop Bk
BM West Simsbury
Old Farms Road
Farms Village
Hop
Road
Brook
Stratton Brook
State Park
Hazel Meadow Pond
Tootin Hill Sch
Massacoe State Forest
Town Pool
Stratton
S I M S B U R Y
Bushy Hill
Ethel Walker Sch
Westover
Road
Hospital
Deer Park
Wilcox Road
Bushy Hill Cem
Russell
Penn Central
LIMIT OF DRAINAGE BASIN


LIMIT OF DRAINAGE BASIN
LIMIT OF IMPACT AREA
STUB POND DAM
Crowleys Corner
Secret Lake
Lily Pond
Golf Club of Avon
Canton Golf Course
BM289
BM196
BM195
BM202
ROAD
TELEPHONE
Nod
STUB POND DAM
DRAINAGE AREA AND
IMPACT AREA
DATUM: NGVD
QUADRANGLE SHEETS


STUB POND DAM
Crowleys Corner
Secret Lake
Wiggins
Nod
Avon
BM269
BM195
Lily Pond
Golf Club
of Avon
West
Avon
ROAD
TELEPHONE
A V O N
STUB POND DAM
DRAINAGE AREA AND
IMPACT AREA
DATUM: NGVD
QUADRANGLE SHEETS:
AVON, CT
COLLINSVILLE, CT
SCALE: 1:24000
PLATE NO. D-1

(3)

HYDROLOGIC AND HYDRAULIC ANALYSIS
SUMMARY SHEET

Dam Stub Pond Dam

Test Flood 100 Year

INFLOW HYDROGRAPH DEVELOPMENT

Drainage Area 5.8 sq. mi.

Probable Maximum Precipation
24 hour - 200 square mile PMP 21.5 inches

Initial Railfall Loss 0 Inch
Uniform Railfall loss .1 Inch

Snyder's Lag 5.5 hours
Snyder's Peaking Coefficient .625

Test Flood Inflow 1806 CFS; 1/2 PMF inflow 3612 CFS

PMF Inflow 7224 CFS

RESERVOIR ROUTING AND DAM OVERTOPPING

Test Flood Outflow 1804 CFS

Spillway Capacity at Top of Dam 53 CFS
3 % of Test Flood

Flow Over Spillway at Test Flood 243 CFS

Spillway Crest Elevation	231.5	Feet
Top of Dam Elevation	232.1	Feet
Test Flood Elevation	233.1	Feet

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION      JULY 1978
  LAST MODIFICATION  26 FEB 79
**********
    1                 A1       DAM SAFETY ANALYSIS - JOB NO. 80-100 / 02 ERJ
    2                 A2       STUB POND DAM - AVON CT.
    3                 A3       I-20-N1
    4                 R      75       1       0       0       0       0       0       2       0       0
    5                 R1      5
    6                 J       1       3       1
    7                 J1    .25     .50    1.0
    8                 K       0       1                                               1
    9                 K1       COMPUTATION OF PMF - DEVELOPMENT OF INFLOW HYDROGRAPH
   10                 M       1       1     5.8               5.8                                     1
   11                 P       0    21.5     110     124     137     142
   12                 T                                                                       0.1
   13                 W     6.5   0.625
   14                 X      10   -0.05     2.0
   15                 K       1       1                                               1
   16                 K1       ROUTING INFLOW HYDROGRAPH THRU POND - OVERTOPPING ANALYSIS
   17                 Y       0                               1       1
   18                 Y1      1                                                      -1
   19                 SA   11.5    12.0   175.0
   20                 SE  231.5   232.1   240.0
   21                 SS  231.5      40     3.0     1.5
   22                 SD  232.1     2.7     1.5     560
   23                 K      99
```

D-3

****
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
****

RUN DATE= 02/09/81.
TIME= 11.49.40.

DAM SAFETY ANALYSIS - JOB NO. 80-100 / 02 ERJ
STUB POND DAM - AVON CT.
1-20-81

JOB SPECIFICATION

NO	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
75	1	0	0	0	0	0	2	0	0

JOPER	NWT	LROPT	TRACE
5	0	0	0

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 3 LRTIO= 1
RTIOS= .25 .50 1.00

****

SUB-AREA RUNOFF COMPUTATION

COMPUTATION OF PMF - DEVELOPMENT OF INFLOW HYDROGRAPH

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	THSDA	THSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	5.80	0.00	5.80	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	21.50	110.00	124.00	133.00	142.00	0.00	0.00

THSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	0.00	.10	0.00	0.00

UNIT HYDROGRAPH DATA
TP= 5.50 CP= .63 NTA= 0

RECESSION DATA
STRTQ= 10.00 QRCSN= -.05 RTIOR= 2.00
APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 6.34 AND R= 5.12 INTERVALS

UNIT HYDROGRAPH 31 END-OF-PERIOD ORDINATES, LAG= 5.49 HOURS, CP= .62 VOL= 1.00

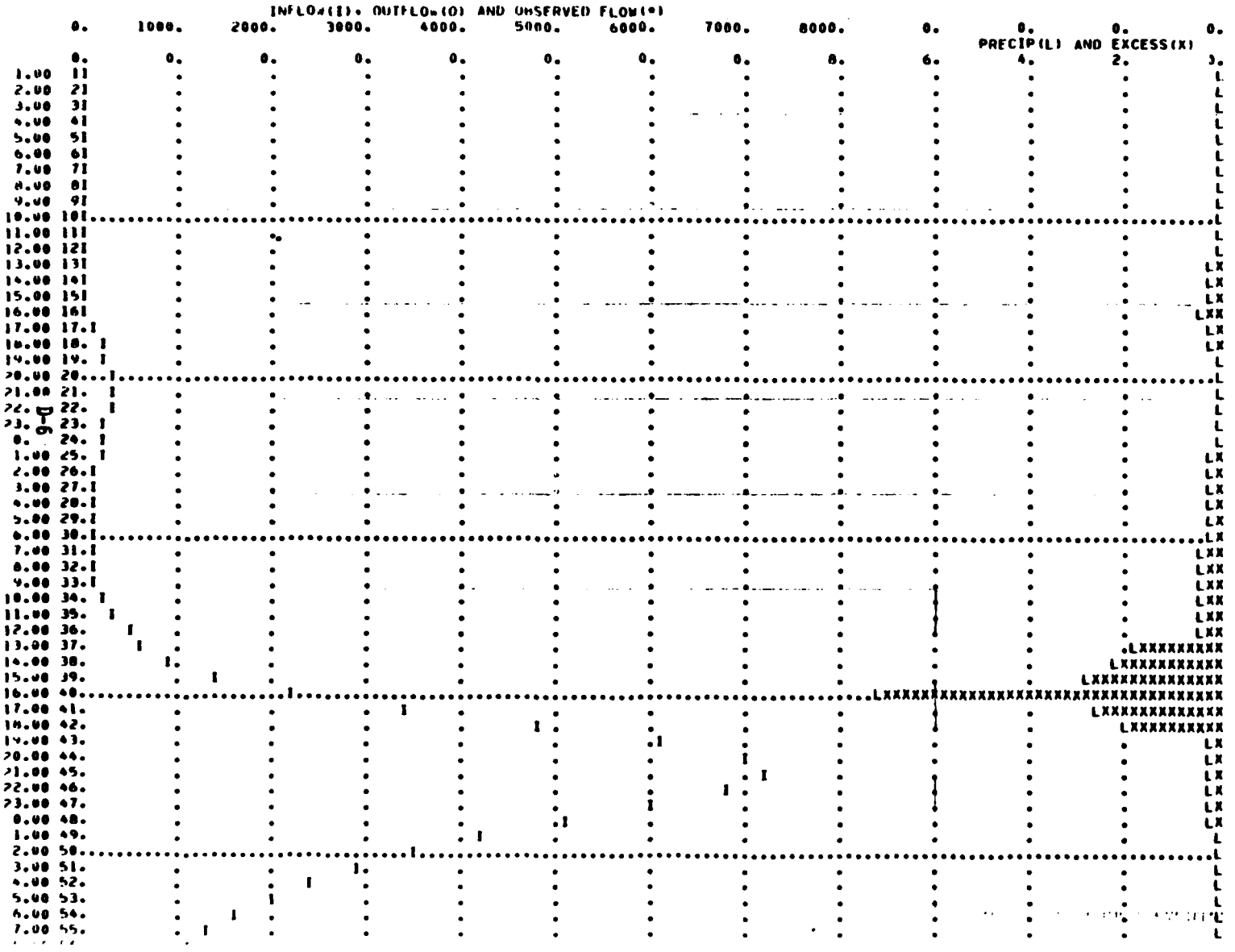
30.	108.	217.	319.	396.	425.	395.	331.	272.	223.
184.	151.	124.	102.	84.	69.	57.	47.	384	31.
26.	21.	17.	14.	12.	10.	8.	7.	5.	4.
4.									

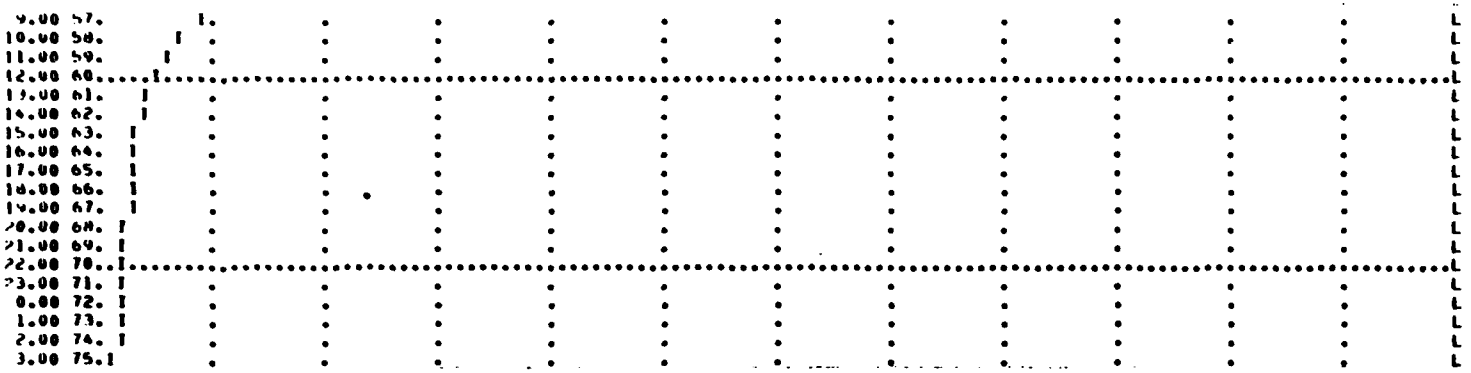
MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	1.00	1	.01	0.00	.01	9.	1.02	14.00	38	2.27	2.17	.10	899.
1.01	2.00	2	.01	0.00	.01	9.	1.02	15.00	39	2.84	2.74	.10	1352.
1.01	3.00	3	.01	0.00	.01	8.	1.02	16.00	40	7.19	7.09	.10	2162.
1.01	4.00	4	.01	0.00	.01	8.	1.02	17.00	41	2.65	2.55	.10	3381.
1.01	5.00	5	.01	0.00	.01	7.	1.02	18.00	42	2.08	1.98	.10	4807.
1.01	6.00	6	.01	0.00	.01	7.	1.02	19.00	43	.15	.05	.10	6122.
1.01	7.00	7	.03	0.00	.03	6.	1.02	20.00	44	.15	.05	.10	6983.
1.01	8.00	8	.03	0.00	.03	6.	1.02	21.00	45	.15	.05	.10	7224.
1.01	9.00	9	.03	0.00	.03	5.	1.02	22.00	46	.15	.05	.10	6819.
1.01	10.00	10	.03	0.00	.03	5.	1.02	23.00	47	.15	.05	.10	5987.
1.01	11.00	11	.03	0.00	.03	5.	1.03	0.00	48	.15	.05	.10	5060.
1.01	12.00	12	.03	0.00	.03	4.	1.03	1.00	49	0.00	0.00	0.00	4206.
1.01	13.00	13	.13	.03	.10	5.	1.03	2.00	50	0.00	0.00	0.00	3487.
1.01	14.00	14	.15	.05	.10	8.	1.03	3.00	51	0.00	0.00	0.00	2890.
1.01	15.00	15	.19	.09	.10	18.	1.03	4.00	52	0.00	0.00	0.00	2391.
1.01	16.00	16	.49	.39	.10	45.	1.03	5.00	53	0.00	0.00	0.00	1974.
1.01	17.00	17	.18	.08	.10	95.	1.03	6.00	54	0.00	0.00	0.00	1625.
1.01	18.00	18	.14	.04	.10	157.	1.03	7.00	55	0.00	0.00	0.00	1336.
1.01	19.00	19	.01	0.00	.01	217.	1.03	8.00	56	0.00	0.00	0.00	1098.
1.01	20.00	20	.01	0.00	.01	259.	1.03	9.00	57	0.00	0.00	0.00	903.
1.01	21.00	21	.01	0.00	.01	273.	1.03	10.00	58	0.00	0.00	0.00	742.
1.01	22.00	22	.01	0.00	.01	256.	1.03	11.00	59	0.00	0.00	0.00	610.
1.01	23.00	23	.01	0.00	.01	221.	1.03	12.00	60	0.00	0.00	0.00	501.
1.02	0.00	24	.01	0.00	.01	184.	1.03	13.00	61	0.00	0.00	0.00	412.
1.02	1.00	25	.10	.00	.10	152.	1.03	14.00	62	0.00	0.00	0.00	354.
1.02	2.00	26	.10	.00	.10	125.	1.03	15.00	63	0.00	0.00	0.00	330.
1.02	3.00	27	.10	.00	.10	104.	1.03	16.00	64	0.00	0.00	0.00	308.
1.02	4.00	28	.10	.00	.10	87.	1.03	17.00	65	0.00	0.00	0.00	287.
1.02	5.00	29	.10	.00	.10	73.	1.03	18.00	66	0.00	0.00	0.00	268.
1.02	6.00	30	.10	.00	.10	62.	1.03	19.00	67	0.00	0.00	0.00	250.
1.02	7.00	31	.40	.30	.10	62.	1.03	20.00	68	0.00	0.00	0.00	233.
1.02	8.00	32	.40	.30	.10	87.	1.03	21.00	69	0.00	0.00	0.00	218.
1.02	9.00	33	.40	.30	.10	144.	1.03	22.00	70	0.00	0.00	0.00	203.
1.02	10.00	34	.40	.30	.10	234.	1.03	23.00	71	0.00	0.00	0.00	189.
1.02	11.00	35	.40	.30	.10	348.	1.04	0.00	72	0.00	0.00	0.00	177.
1.02	12.00	36	.40	.30	.10	472.	1.04	1.00	73	0.00	0.00	0.00	165.
1.02	13.00	37	1.89	1.79	.10	631.	1.04	2.00	74	0.00	0.00	0.00	154.
							1.04	3.00	75	0.00	0.00	0.00	144.
									SUM	24.42	21.16	3.27	80649.
										(620.)	(537.)	(83.)	(2283.73)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7224.	6345.	3049.	1119.	80572.
CMS	205.	180.	86.	32.	2282.
INCHES		10.18	19.56	21.53	21.54
MM		258.47	496.03	546.94	547.06
AC-FT		3146.	6048.	6657.	6659.
THOUS CU M		3881.	7460.	8212.	8214.

•OVF•

STATION 1

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20.00 68.
21.00 69.
22.00 70.
23.00 71.
0.00 72.
1.00 73.
2.00 74.
3.00 75.

DVN

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

2.	2.	2.	2.	2.	2.	2.	1.	1.	1.
1.	1.	1.	2.	4.	11.	24.	39.	54.	65.
68.	64.	55.	46.	38.	31.	26.	22.	18.	16.
16.	22.	36.	59.	87.	118.	158.	225.	338.	540.
965.	1202.	1530.	1746.	1806.	1705.	1497.	1265.	1051.	872.
722.	598.	493.	406.	334.	275.	226.	186.	152.	125.
103.	88.	82.	77.	72.	67.	63.	58.	54.	51.
47.	44.	41.	38.	36.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1806.	1586.	762.	280.	20143.
CMS	51.	45.	22.	8.	570.
INCHES		2.54	4.89	5.38	5.38
MM		64.62	124.21	136.73	136.76
AC-FT		787.	1512.	1664.	1665.
THOUS CU M		970.	1865.	2053.	2053.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

5.	4.	4.	4.	4.	3.	3.	3.	3.	3.
2.	2.	2.	4.	9.	22.	47.	79.	109.	129.
136.	128.	110.	92.	76.	63.	52.	43.	37.	31.
31.	44.	72.	117.	174.	236.	315.	449.	676.	1081.
1690.	2404.	3061.	3491.	3612.	3409.	2994.	2530.	2103.	1744.
1445.	1196.	987.	813.	668.	549.	451.	371.	305.	251.
206.	177.	165.	154.	144.	134.	125.	117.	109.	102.
95.	88.	82.	77.	72.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3612.	3172.	1524.	559.	40286.
CMS	102.	90.	43.	16.	1141.
INCHES		5.09	9.78	10.77	10.77
MM		129.24	248.42	273.47	273.53
AC-FT		1573.	3024.	3329.	3329.
THOUS CU M		1940.	3730.	4106.	4107.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

9.	9.	8.	8.	7.	7.	6.	6.	5.	5.
5.	4.	5.	8.	18.	45.	95.	157.	217.	259.
273.	256.	221.	184.	152.	125.	104.	87.	73.	62.
62.	87.	144.	234.	348.	472.	631.	899.	1352.	2162.
3381.	4807.	6122.	6983.	7224.	6819.	5987.	5060.	4206.	3487.
2890.	2391.	1974.	1625.	1336.	1098.	903.	742.	610.	501.
412.	354.	330.	308.	287.	268.	250.	233.	218.	203.
189.	177.	165.	154.	144.					

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7224.	6345.	3049.	1119.	80572.
CMS	205.	180.	86.	32.	2282.
INCHES		10.18	19.56	21.53	21.54
MM		258.47	496.83	546.94	547.06
AC-FT		3146.	6048.	6657.	6659.
THOUS CU M		3881.	7460.	8212.	8214.

HYDROGRAPH ROUTING

ROUTING INFLOW HYDROGRAPH THRU POND - OVERTOPPING ANALYSIS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1.	0

SURFACE AREA=	12.	12.	175.
CAPACITY=	0.	7.	620.
ELEVATION=	232.	232.	240.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
231.5	40.0	3.0	1.5	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
232.1	2.7	1.5	560.

STATION 1, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	2.	3.	9.	19.	35.	50.
64.	66.	61.	52.	46.	39.	33.	28.	23.	20.
19.	19.	24.	37.	62.	118.	148.	215.	320.	512.
807.	1163.	1498.	1729.	1804.	1727.	1519.	1292.	1072.	890.
737.	611.	505.	416.	342.	282.	232.	191.	157.	130.
107.	91.	86.	80.	75.	70.	66.	62.	58.	56.
51.	50.	45.	44.	40.					

STORAGE

0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
1.	1.	1.	1.	1.	1.	2.	3.	5.	7.
7.	7.	7.	7.	6.	6.	5.	4.	4.	4.
3.	3.	4.	5.	7.	8.	9.	10.	11.	13.
15.	19.	22.	24.	24.	24.	22.	20.	18.	16.
15.	14.	13.	12.	11.	10.	10.	9.	9.	8.
8.	8.	8.	8.	8.	7.	7.	7.	7.	7.
7.	7.	6.	6.	6.					

STAGE

231.5	231.5	231.6	231.5	231.5	231.5	231.5	231.5	231.5	231.5
231.5	231.5	231.5	231.5	231.6	231.6	231.7	231.8	231.9	232.1
232.1	232.1	232.1	232.1	232.0	232.0	231.9	231.9	231.8	231.8
231.8	231.8	231.8	232.0	232.1	232.2	232.2	232.3	232.4	232.5
232.7	232.8	233.0	233.1	233.1	233.1	233.0	232.9	232.8	232.7
232.6	232.6	232.5	232.4	232.4	232.3	232.3	232.3	232.2	232.2
232.2	232.2	232.2	232.2	232.1	232.1	232.1	232.1	232.1	232.1
232.1	232.1	232.0	232.0	232.0					

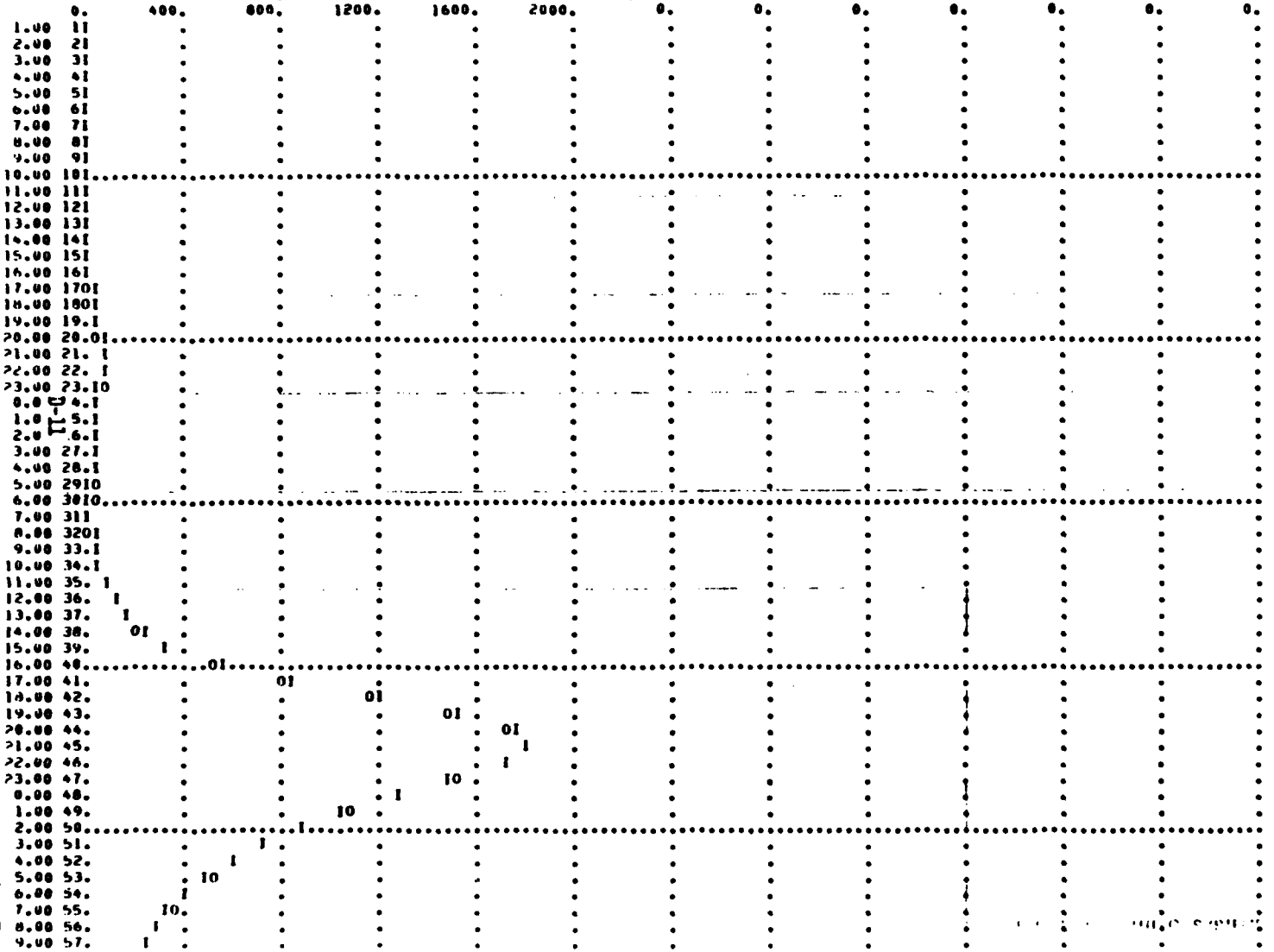
PEAK OUTFLOW IS 1804. AT TIME 45.00 HOURS

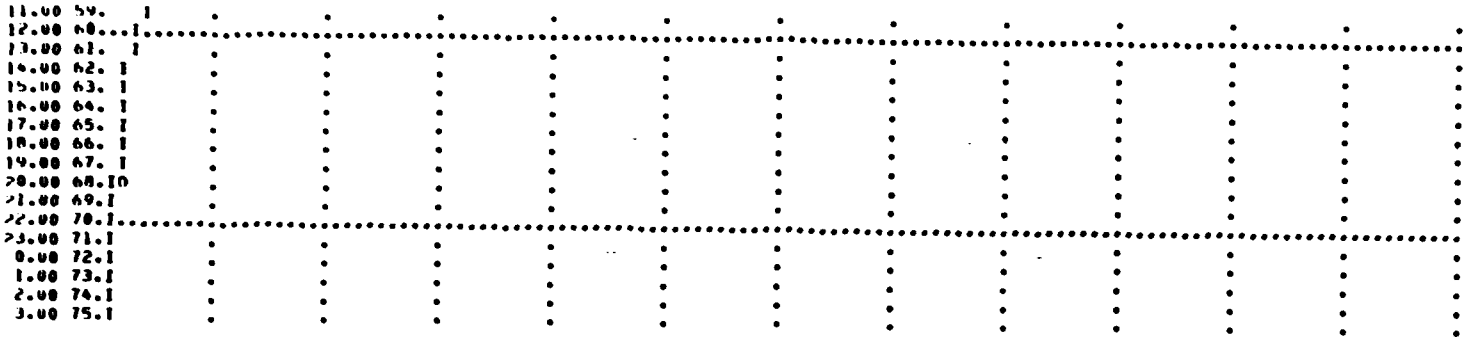
CFS	1804.	1584.	762.	279.	20100.
CMS	51.	45.	22.	8.	569.
INCHES		2.54	4.89	5.37	5.37
MM		64.53	124.20	136.47	136.47
AC-FT		785.	1512.	1661.	1661.
THOUS CU M		969.	1865.	2049.	2049.

OUT

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)

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12.00 60. I
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19.00 67. I
20.00 68. I
21.00 69. I
22.00 70. I
23.00 71. I
0.00 72. I
1.00 73. I
2.00 74. I
3.00 75. I

DVN

STATION 1. PLAN 1. RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

1.	2.	2.	2.	3.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	8.	21.	45.	97.	129.
133.	132.	113.	96.	79.	66.	56.	51.	44.	38.
34.	35.	49.	102.	167.	226.	304.	429.	646.	1027.
1618.	2324.	2993.	3455.	3612.	3447.	3047.	2581.	2147.	1779.
1475.	1220.	1008.	830.	683.	562.	462.	380.	313.	257.
212.	180.	169.	157.	147.	137.	128.	120.	112.	105.
98.	91.	86.	80.	75.					

STORAGE

0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	4.	6.	8.	8.
9.	8.	8.	8.	8.	7.	7.	7.	6.	5.
5.	5.	6.	8.	9.	10.	11.	12.	14.	17.
23.	29.	35.	39.	41.	39.	36.	31.	27.	24.
21.	19.	17.	16.	14.	13.	12.	11.	11.	10.
10.	9.	9.	9.	9.	9.	8.	8.	8.	8.
8.	8.	8.	8.	8.					

STAGE

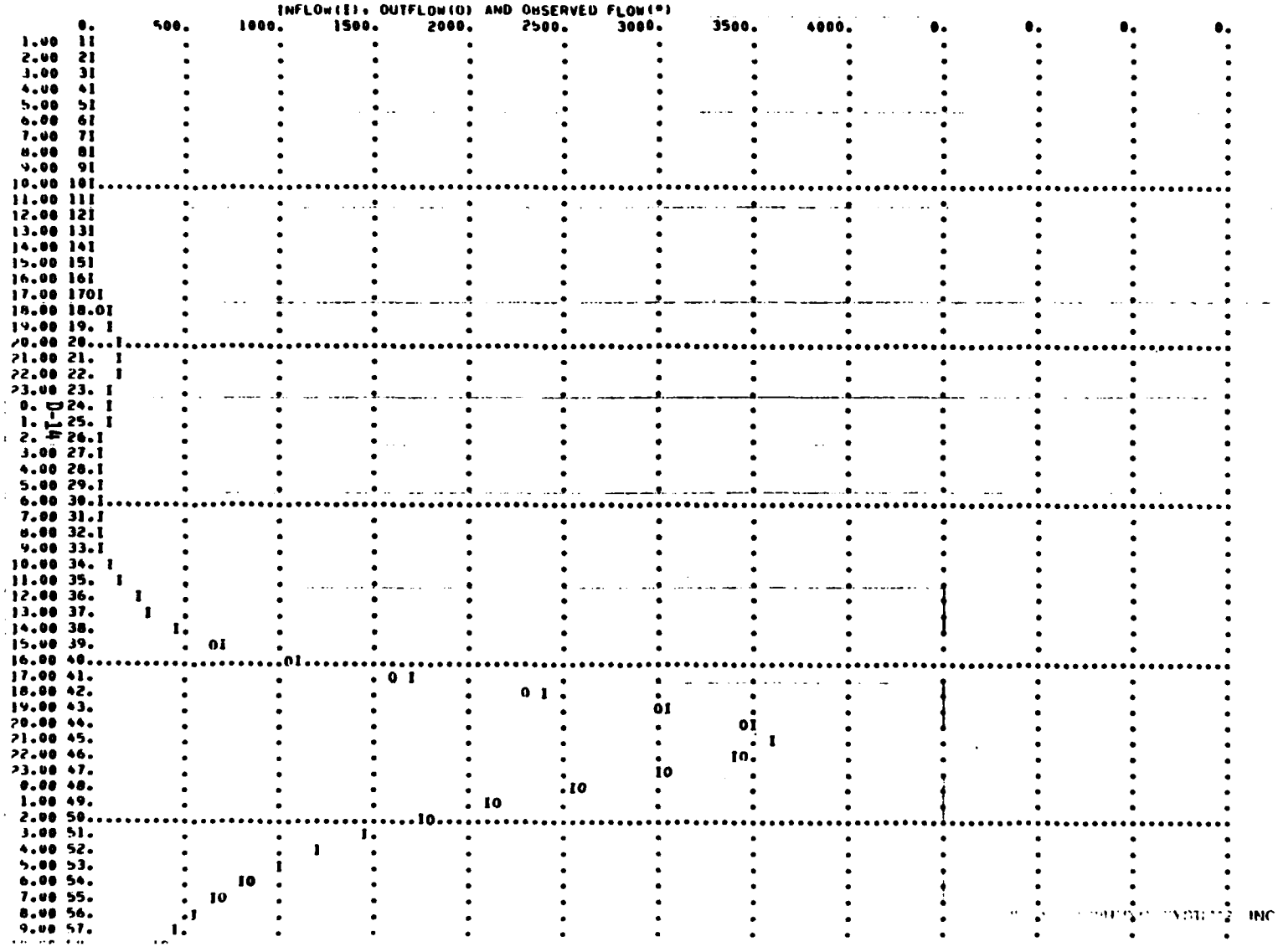
231.5	231.6	231.6	231.6	231.6	231.6	231.6	231.6	231.6	231.6
231.6	231.6	231.6	231.6	231.6	231.7	231.8	232.0	232.2	232.2
232.2	232.2	232.2	232.2	232.1	232.1	232.1	232.1	232.0	232.0
231.9	231.9	232.0	232.2	232.3	232.3	232.4	232.5	232.6	232.8
233.0	233.3	233.6	233.7	233.8	233.7	233.6	233.4	233.3	233.1
233.0	232.9	232.8	232.7	232.6	232.5	232.5	232.4	232.4	232.3
232.3	232.3	232.3	232.2	232.2	232.2	232.2	232.2	232.2	232.2
232.2	232.2	232.2	232.2	232.1					

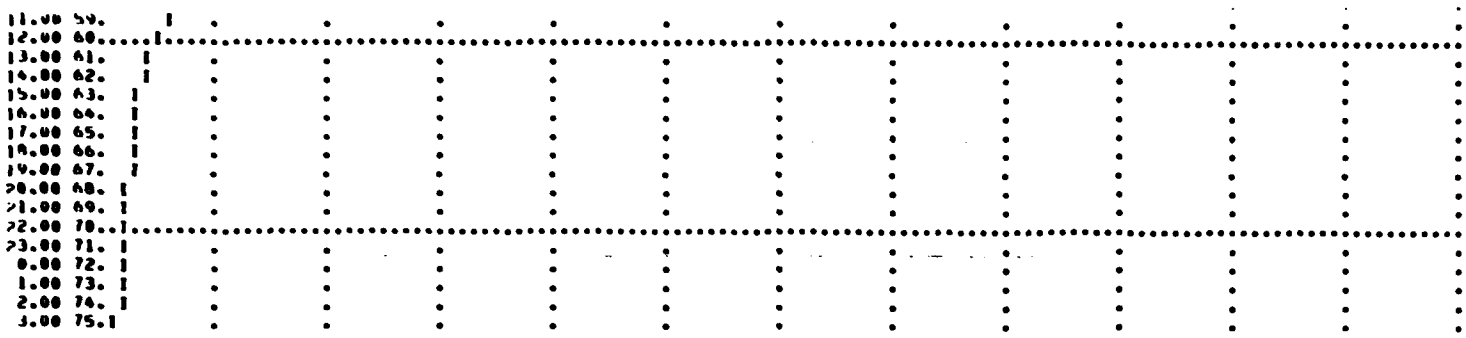
PEAK OUTFLOW IS 3612. AT TIME 45.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3612.	3168.	1524.	599.	40217.
CMS	102.	90.	43.	16.	1139.
INCHES		5.08	9.78	10.75	10.75
MM		129.05	248.39	273.04	273.06
AC-FT		1571.	3023.	3323.	3324.
THOUS CU M		1938.	3729.	4099.	4100.

OVF

STATION 1

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20.00 68.
21.00 69.
22.00 70.
23.00 71.
0.00 72.
1.00 73.
2.00 74.
3.00 75.

DVN

STATION 1, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

2.	4.	6.	6.	6.	6.	6.	6.	6.	6.
6.	5.	5.	6.	9.	19.	48.	148.	208.	255.
270.	262.	225.	190.	156.	130.	107.	90.	88.	64.
63.	78.	132.	220.	333.	457.	610.	863.	1295.	2056.
3228.	4632.	5964.	6895.	7223.	6906.	6111.	5175.	4303.	3563.
2952.	2441.	2016.	1660.	1365.	1122.	922.	758.	624.	513.
422.	359.	335.	313.	292.	272.	254.	237.	222.	207.
193.	180.	169.	157.	147.					

STORAGE

1.	1.	1.	2.	2.	2.	2.	2.	2.	2.
2.	1.	1.	1.	2.	3.	6.	9.	9.	10.
10.	10.	10.	9.	9.	8.	8.	8.	8.	7.
7.	8.	8.	10.	11.	12.	14.	16.	20.	27.
37.	51.	65.	75.	78.	75.	66.	56.	48.	40.
35.	30.	26.	23.	20.	18.	16.	15.	14.	13.
12.	11.	11.	11.	10.	10.	10.	10.	10.	9.
9.	9.	9.	9.	9.					

STAGE

231.6	231.6	231.6	231.6	231.6	231.6	231.6	231.6	231.6	231.6
231.6	231.6	231.6	231.6	231.7	231.8	232.0	232.2	232.3	232.3
232.3	232.3	232.3	232.3	232.2	232.2	232.2	232.2	232.2	232.1
232.1	232.1	232.2	232.3	232.4	232.5	232.6	232.7	232.9	233.2
233.6	234.1	234.4	234.7	234.7	234.7	234.5	234.2	234.0	233.7
233.5	233.4	233.2	233.1	232.9	232.8	232.7	232.6	232.6	232.5
232.4	232.4	232.4	232.4	232.4	232.3	232.3	232.3	232.3	232.3
232.3	232.3	232.3	232.2	232.2					

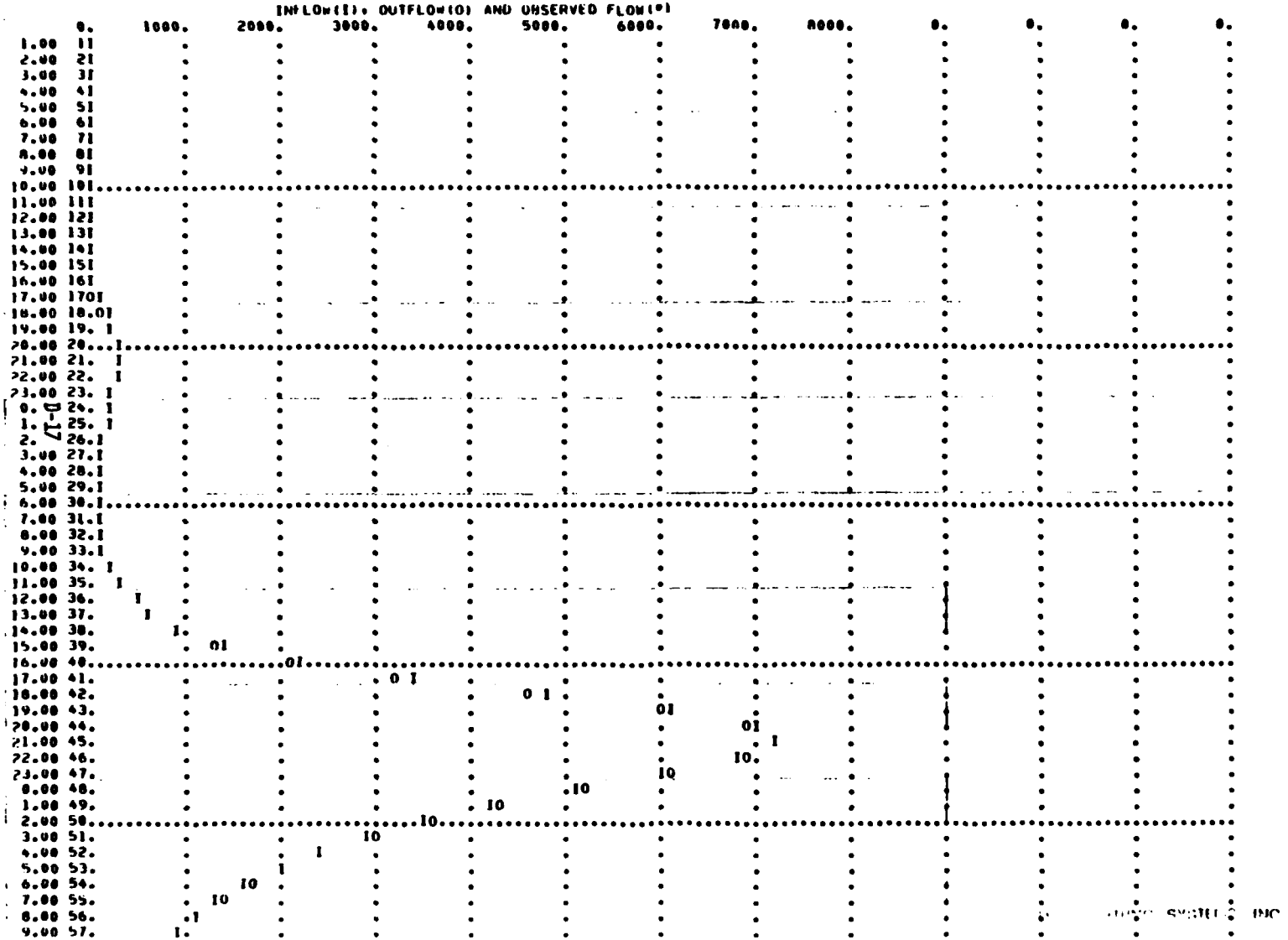
PEAK OUTFLOW IS 7223. AT TIME 45.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7223.	6334.	3049.	1118.	80504.
CMS	205.	179.	86.	32.	2280.
INCHES		10.16	19.56	21.52	21.52
MM		258.02	496.79	546.54	546.59
AC-FT		3141.	6047.	6653.	6653.
THOUS CU M		3874.	7459.	8206.	8207.

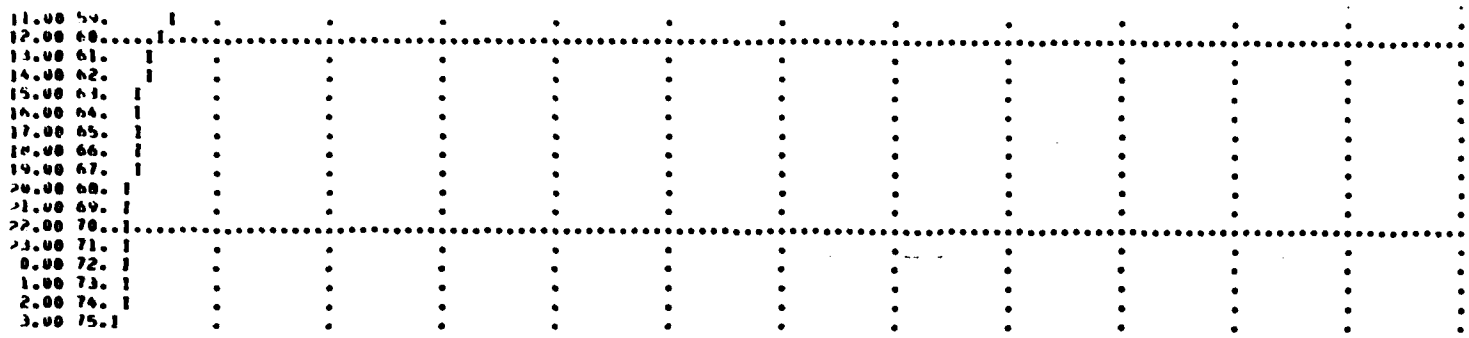
OUTF

STATION 1

INFLOW(I), OUTFLOW(O) AND OBSERVED FLOW(*)



D-17


11.00 59.
12.00 60.
13.00 61.
14.00 62.
15.00 63.
16.00 64.
17.00 65.
18.00 66.
19.00 67.
20.00 68.
21.00 69.
22.00 70.
23.00 71.
0.00 72.
1.00 73.
2.00 74.
3.00 75.1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 .25	RATIO 2 .50	RATIO 3 1.00
HYDROGRAPH AT	1	5.80 (15.02)	1	1806. (51.14)	3612. (102.28)	7224. (204.57)
ROUTED TO	1	5.80 (15.02)	1	1804. (51.08)	3612. (102.29)	7223. (204.54)

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	231.50	231.50	232.10
STORAGE	0.	0.	7.
OUTFLOW	0.	0.	56.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
.25	233.12	1.02	24.	1804.	38.00	45.00	0.00
.50	233.75	1.65	41.	3612.	51.00	45.00	0.00
1.00	234.75	2.65	78.	7223.	58.00	45.00	0.00

STUB POND DAM

Dam Failure Analysis

1. Failure discharge with pool at top of dam (elev. 234.2) = 4400 CFS
2. Depth of water in reservoir at time of failure = 6.7 ft.
3. Maximum depth of flow downstream of dam = 6.7 ft.
4. Water surface elevation just downstream of dam at time of failure) = 233.6

The failure discharge of 4400 CFS will enter and flow downstream 8000 feet until the brook enters the Farmington River. Valley storage in this 8000 feet length of brook is SIGNIFICANT in reducing the discharge. Also due to roughness characteristics, obstructions and frictional losses, it is very likely that the unsteady dam failure flow will dissipate its wave and kinetic energy and thus convert to steady and uniform flow obeying Manning's formulae 8000 feet downstream. The failure profile will have the following hydraulic characteristics:

DISTANCE FROM THE DAM	WATER SURFACE ELEVATION	DEPTH (ft.)	REMARKS
0	233.6	6.7	At Dam
300	225.7	3.7	
1400	215.4	7.4	
2300	195.2	5.2	
3700	176.5	3.5	Route 10
8000	160±	0	Farmington River

NOTES:

"Rule of Thumb" Guidance for Estimating
Downstream Dam Failure Analysis

DATA

Name of Dam STUB POND DAM

Location AVON, CONNECTICUT

Drainage Area 5.8 sq. mi., Top of Dam 234.2

Spillway Type Flashboards, Crest of Spillway 233.6 (flashboards)

Surface Area @ Crest Elev. 11.5 Acres = 0.02 sq. mi.

Pool Bottom Near Dam = 226.9

Assumed Side Slopes of Embankments = 2:1

Depth of Pool at Dam (Yo) = 6.7 Feet

Mid-Height Elev. 230.25

Length of Dam at Crest = 600 Feet

Length of Dam at Mid-Height = 600 Feet

25% of Dam Length at Mid-Height = W_b = 150 Feet

Step 1

Storage (S) at time of failure 30 Ac-FT
(Equal to top of dam)

Step 2

Peak Failure Discharge

$$Q_{pl} = 8/27\ W_b \sqrt{g}\ Yo^{3/2}$$

$$= (1.68)\ (W_b)\ (Y_o)^{3/2} = 4400 \text{ cfs}$$

Failure is assumed to coincide with pool elevation at Top of Dam

NOTES: Datum is Metropolitan District Commission (MDC).
NGVD = MDC - 2.08 feet.

BY EBJ DATE 11/19/80 SUBJECT DAM INSPECTION STUDY SHEET NO. 1 OF 4

CHKD. BY JR DATE 12/5/80 JOB NO. 80-100/02

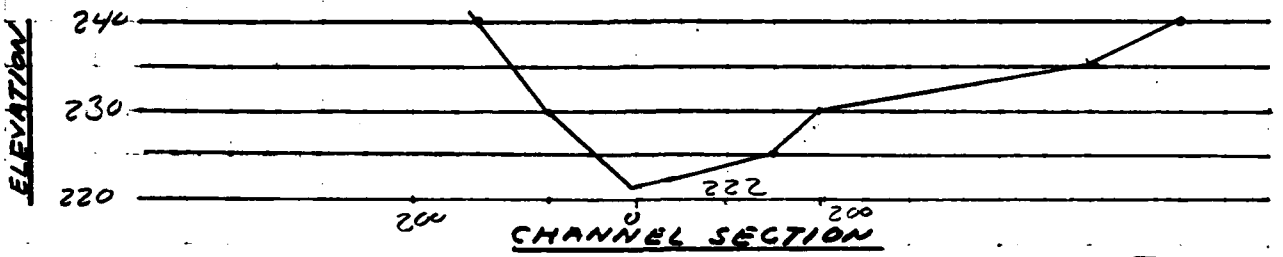
DAM FAILURE ANALYSIS

PURCELL ASSOCIATES
ENGINEERS • ARCHITECTS • PLANNERS

DAM STUB POND

SECTION 300' FROM DAM

USING $Q = \frac{1.486}{n} A R^{2/3} S_L^{1/2}$ $n =$ .05 SLOPE (S_L) = .015

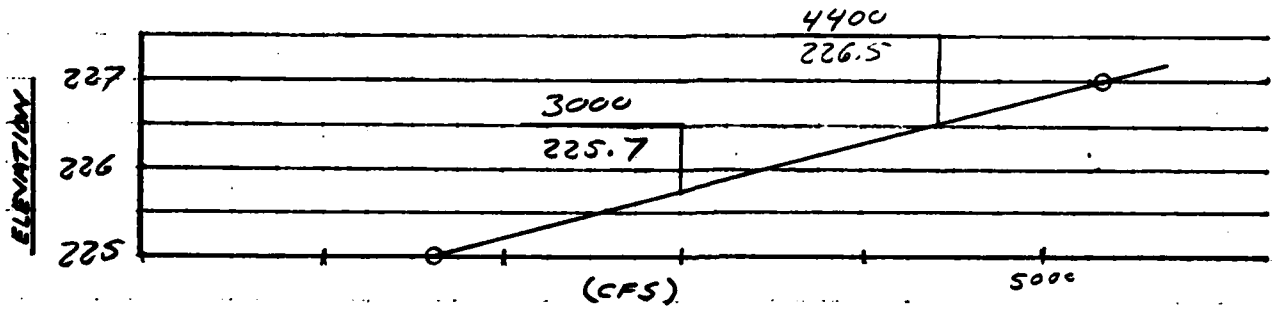


CHANNEL SECTION

FULL SPILLWAY Q_s = 55 CFS

Q_{P_1} = 4400 CFS TOTAL STORAGE (S) = 30 AC-FT

ELEV	AREA	WP	R	Q	DEPTH
230	1480	300	4.9	15600	8
225	330	200	1.7	1680	3
227	700	230	3.0	5370	5



$V_1 = \left(\frac{6.7 + 4.5}{2}\right)\left(\frac{150 + 230}{2}\right)\left(\frac{300}{43560}\right)\left(\frac{1}{2}\right)$ = 9.5 AC-FT

$Q_{P_2} = Q_{P_1}(1 - V_1/S)$ = 3000 CFS V_{AVG} = 9.1

$V_2 = \left(\frac{6.7 + 3.7}{2}\right)(.65)$ = 8.7 AC-FT

$Q_{P_2} = Q_{P_1}(1 - V_{AVG}/S)$ = 3050 CFS ELEV = 225.7

DEPTH = 3.7

FULL SPILLWAY & DEPTH = 0

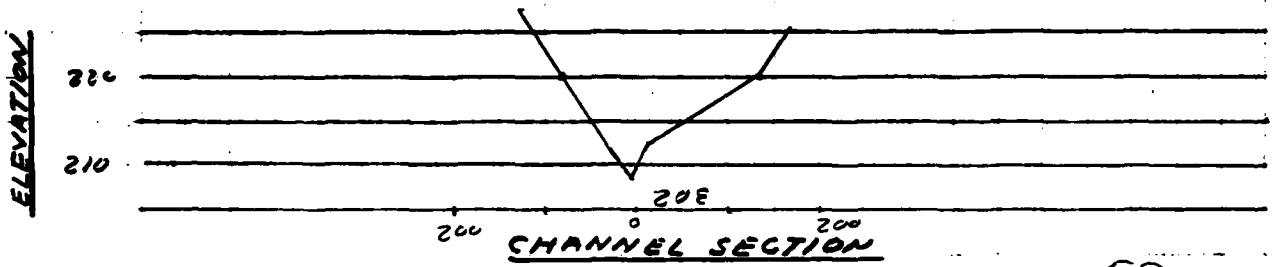
INCREASE DUE TO DAM FAILURE = 3.7

BY RAJ DATE 11/19/80 SUBJECT DAM INSPECTION STUDY SHEET NO. 2 OF 4
CHKD. BY JK DATE 12/5/80 JOB NO. 80-100/02
DAM FAILURE ANALYSIS
PURCELL ASSOCIATES ENGINEERS • ARCHITECTS • PLANNERS

DAM STUB POND

SECTION 1400' FROM DAM

USING $Q = \frac{1.486}{n} A R^{2/3} S_L^{1/2}$ $n = .05$ SLOPE (S_L) = .01 ft/ft

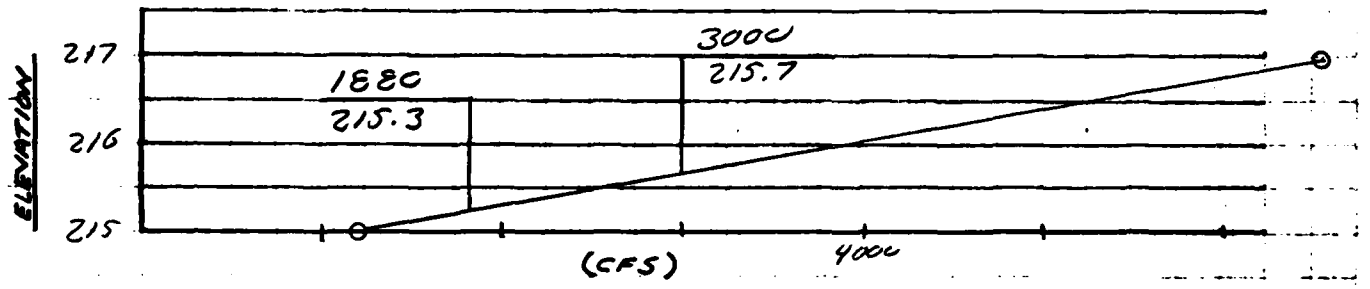


CHANNEL SECTION

FULL SPILLWAY Q_s = 55 CFS

Q_{P_1} = 3050 CFS TOTAL STORAGE (S) = 30 AC-FT

ELEV	AREA	WP	R	Q	DEPTH
220	1180	210	5.6	11100	12
215	330	100	3.3	2180	7
217	755	150	5.0	6600	9
213	175	50	3.5	1200	5



$V_1 = \left(\frac{3.7 + 7.7}{2}\right)\left(\frac{200 + 120}{2}\right)\left(\frac{1100}{43560}\right)\left(\frac{1}{2}\right)$ = 11.5 AC-FT

$Q_{P_2} = Q_{P_1}(1 - V_1/S)$ = 1880 CFS V_{AVG} = 11.25

$V_2 = \left(\frac{3.7 + 7.3}{2}\right)(2.0)$ = 11 AC-FT

$Q_{P_2} = Q_{P_1}(1 - V_{AVG}/S)$ = 1900 CFS ELEV = 215.4

DEPTH = 7.4

FULL SPILLWAY & DEPTH = —

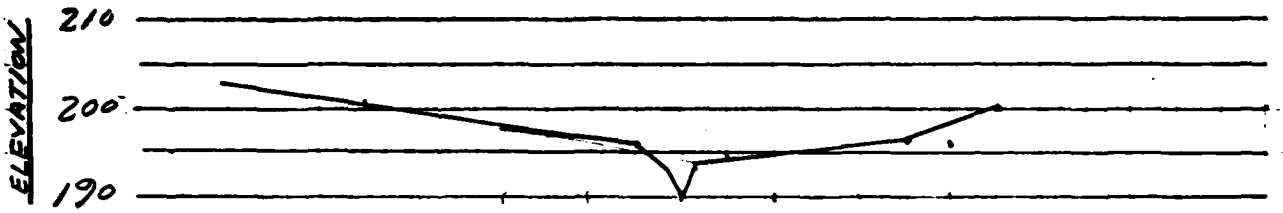
INCREASE DUE TO DAM FAILURE = 7.4

BY. EBJ DATE 11/12/80 SUBJECT DAM INSPECTION STUDY SHEET NO. 3 OF 4
CHKD. BY. JR DATE 12/5/80 JOB NO. 80-100/02
DAM FAILURE ANALYSIS
FURCELL ASSOCIATES ENGINEERS • ARCHITECTS • PLANNERS

DAM STUB POND

SECTION 2300' FROM DAM

USING $Q = \frac{1.486}{n} A R^{2/3} S_L^{1/2}$ $n =$ .105 SLOPE (S_L) = .02

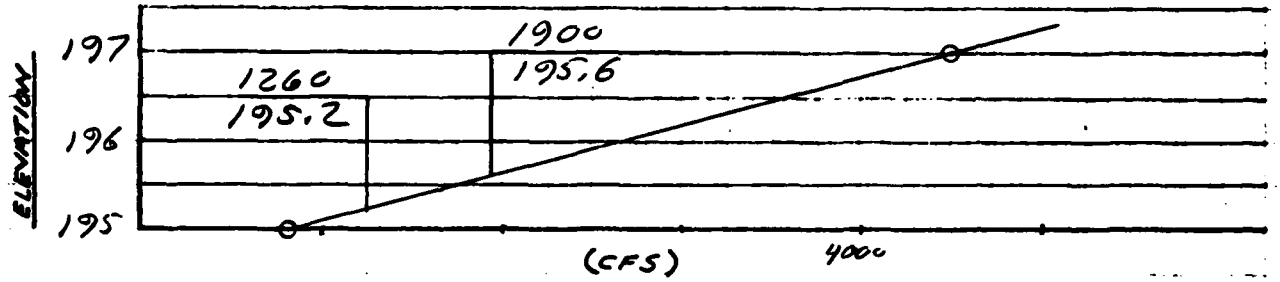


CHANNEL SECTION

FULL SPILLWAY $Q_s =$ 55 CFS

$Q_{P_1} =$ 1900 CFS TOTAL STORAGE (S) = 30 AC-FT

ELEV	AREA	WP	R	Q	DEPTH
200	1950	650	3	17000	10
195	175	150	1.2	820	5
197	755	450	1.7	4500	7



$V_1 = \left(\frac{7.4 + 5.6}{2}\right)\left(\frac{120 + 180}{2}\right)\left(\frac{900}{43560}\right)\left(\frac{1}{2}\right) =$ 10.0 AC-FT

$Q_{P_2} = Q_{P_1}\left(1 - V_1/S\right) =$ 1260 CFS $V_{AVG} =$ 9.88

$V_2 = \left(\frac{7.4 + 5.2}{2}\right)\left(1.55\right) =$ 9.76 AC-FT

$Q_{P_2} = Q_{P_1}\left(1 - V_{AVG}/S\right) =$ 1275 CFS ELEV = 195.2

DEPTH = 5.2

FULL SPILLWAY & DEPTH = —

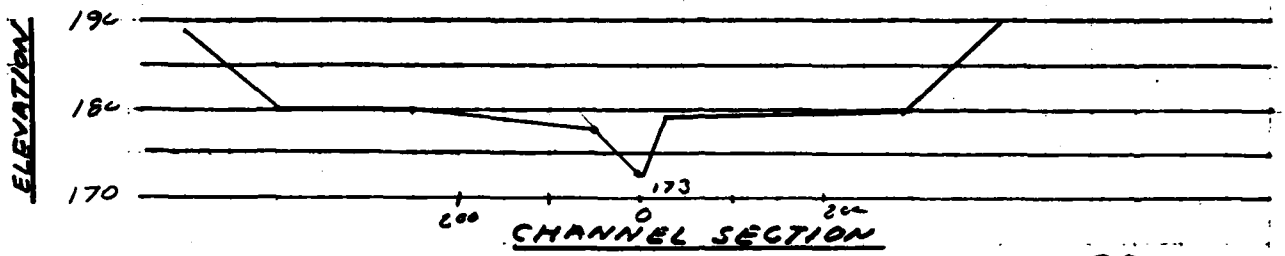
INCREASE DUE TO DAM FAILURE = 5.2

BY EBJ DATE 11/29/8C SUBJECT DAM INSPECTION STUDY SHEET NO. 4 OF 4
CHKD. BY JR DATE 12/5/8C JOB NO. 80-100/02
DAM FAILURE ANALYSIS
FURCELL ASSOCIATES ENGINEERS • ARCHITECTS • PLANNERS

DAM STUB POND

SECTION 3700' FROM DAM

USING $Q = \frac{1.486}{n} A R^{2/3} S_L^{1/2}$ $n = .05$ SLOPE (S_L) = .012 ft/ft



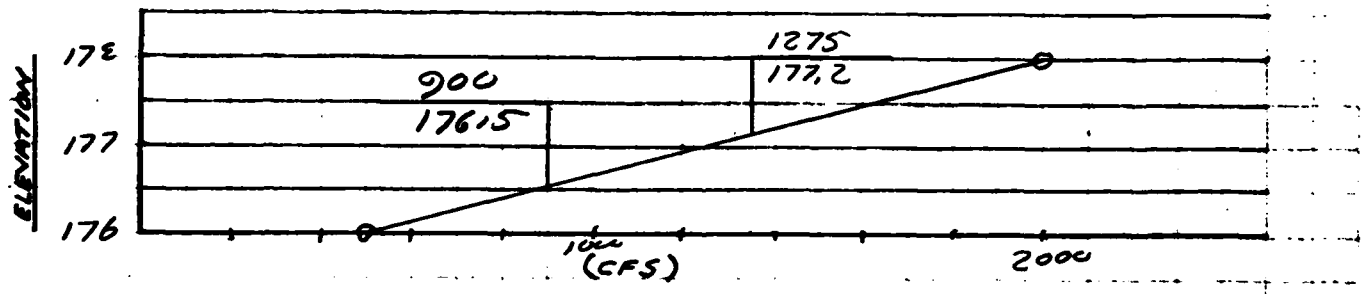
CHANNEL SECTION

Q_{P_1} = 1275 CFS

FULL SPILLWAY Q_S = 55 CFS

TOTAL STORAGE (S) = 30 AC-FT

ELEV	AREA	WP	R	Q	DEPTH
178	375	180	2.1	2000	5
176	105	70	1.5	450	3



$V_1 = \left(\frac{5.2 + 4.2}{2}\right)\left(\frac{180 + 60}{2}\right)\left(\frac{1400}{43560}\right)\left(\frac{1}{2}\right)$ = 9.1 AC-FT

$Q_{P_2} = Q_{P_1}(1 - V_1/S)$ = 900 CFS V_{AVG} = 8.7

$V_2 = \left(\frac{5.2 + 3.5}{2}\right)(1.9)$ = 8.3 AC-FT

$Q_{P_2} = Q_{P_1}(1 - V_{AVG}/S)$ = 900 CFS ELEV = 176.5

DEPTH = 3.5

FULL SPILLWAY & DEPTH = —

INCREASE DUE TO DAM FAILURE = 3.5'

Stub Pond Dam

A. Size Classification

Height of dam = 6.7 ft.; hence SMALL

Storage capacity at top of dam (elev. 234.2) = 30 AC-FT.; hence SMALL

Adopted size classification: SMALL

B.i) Hazard Potential

Failure can cause damage to seven (7) buildings along the downstream channel. The potential exists for the loss of a few lives.

Adopted hazard classification: SIGNIFICANT

ii) Impact of Failure of Dam with pool at top of dam

It is estimated from the "rule of thumb" failure hydrograph, that the following adverse impacts are a possibility by the failure of this dam.

a) Loss of homes 0;
b) Loss of buildings 7;
c) Loss of highways or roads 6 footpaths;
d) Loss of bridges 6;

The failure profile can affect a distance of 8000 feet from the dam.

C. Hazard Potential Classifications

HAZARD	SIZE	TEST FLOOD RANGE
SIGNIFICANT	SMALL	100 Yr. to 1/2 PMF

Adopted Test Flood = 100 Yr. = 310 CSM

= 1800 CFS

D. Overtopping Potential

Drainage Area -------- = 5.8 sq. miles

Spillway crest elevation = 231.5

Top of Dam Elevation = 232.1

Maximum spillway discharge

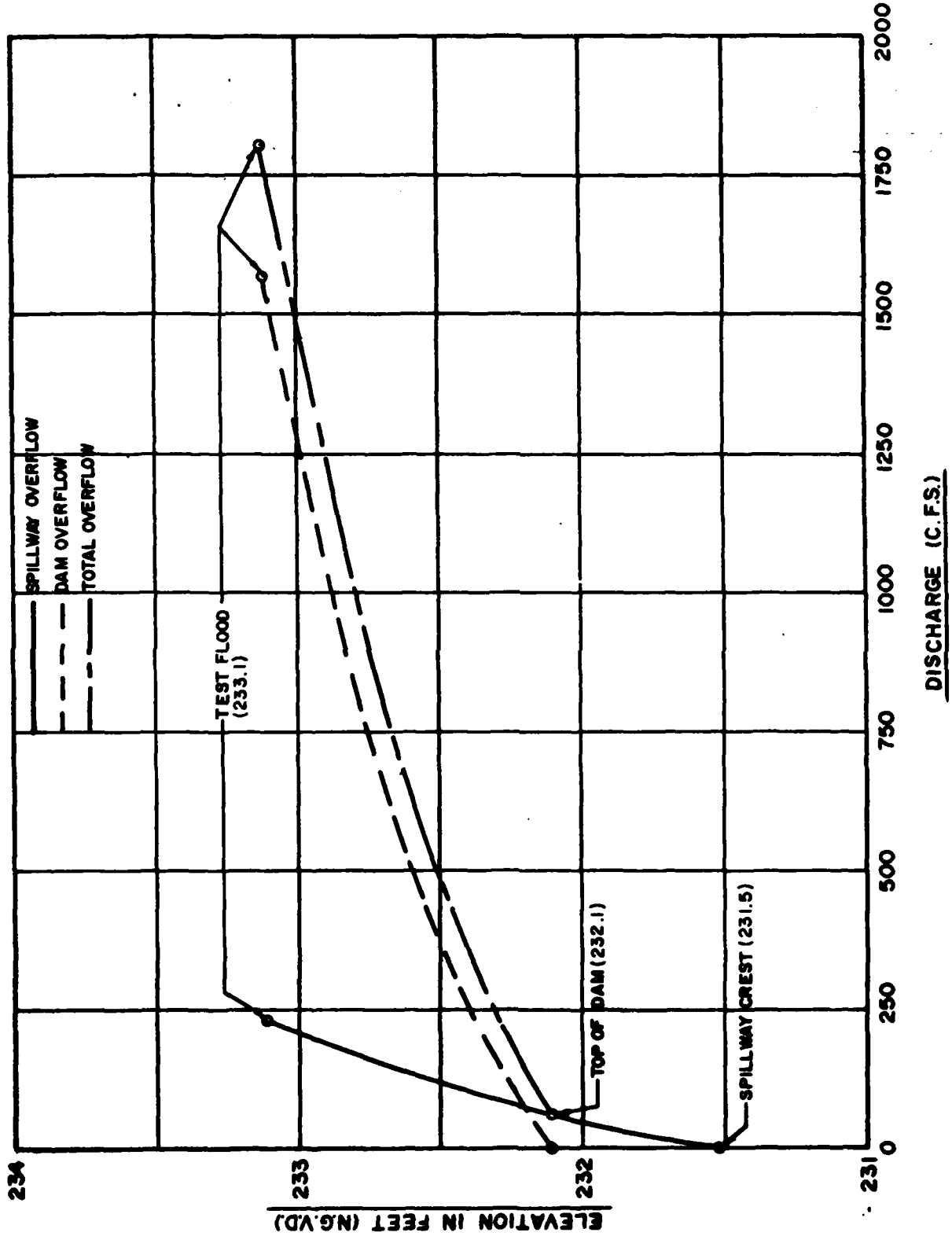
Capacity without overtopping of dam = 53 CFS
"test flood" inflow discharge = 1800 CFS
"test flood" outflow discharge = 1800 CFS

Rating Curve Development

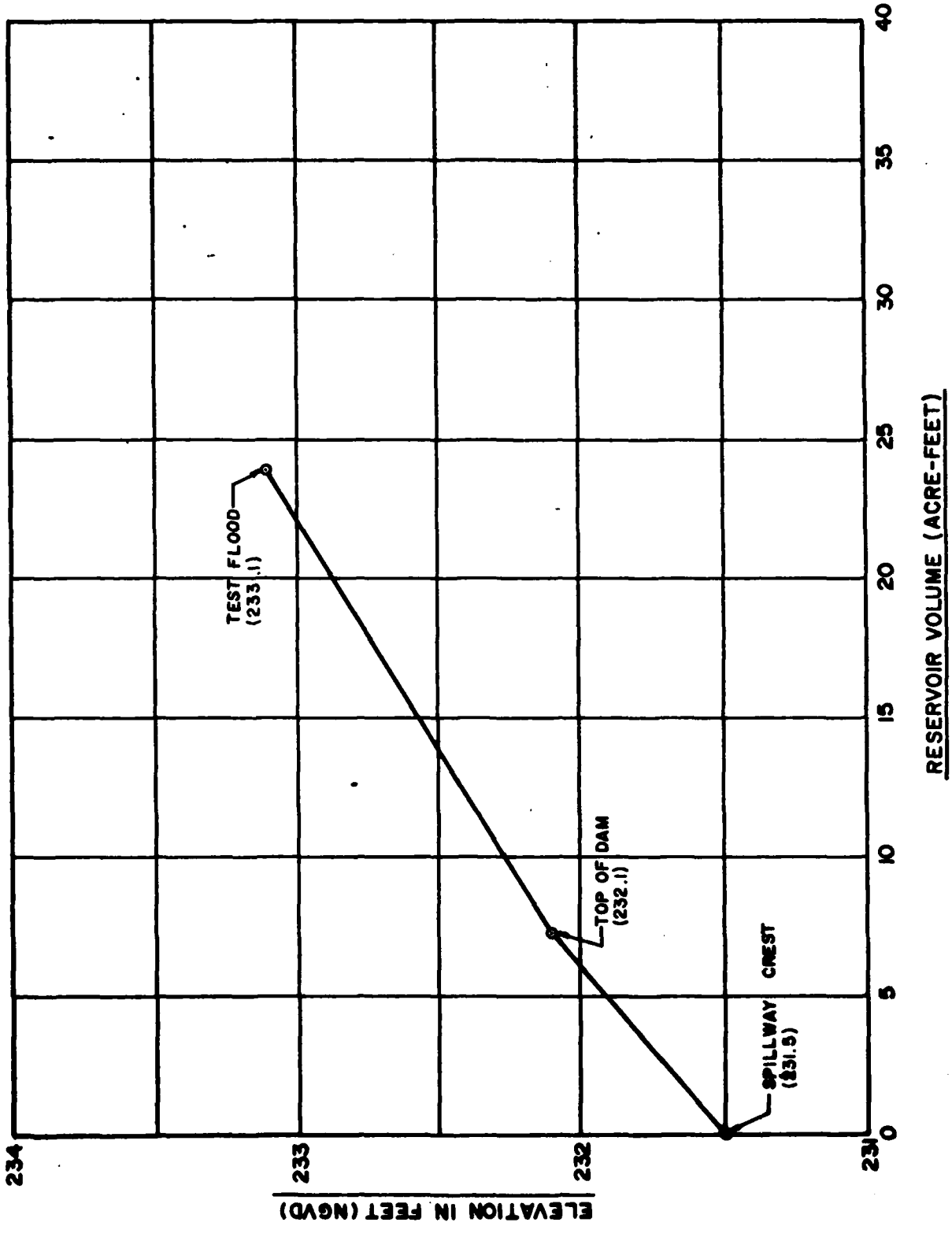
Stub Pond Dam

Spillway

$Q = CLH^{3/2}$
$C = 3.00$
$L = 40$ Feet



STUB POND DAM
SPILLWAY RATING CURVE



STUB POND DAM
RESERVOIR STAGE-CAPACITY CURVE

APPENDIX E

INFORMATION AS CONTAINED IN THE

NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS IN THE UNITED STATES

(1) STATE	(2) AGENCY NUMBER	(3) DIVISION	(4) STATE	(5) COUNTY	(6) CONGR DIST.	(7) STATE	(8) COUNTY	(9) CONGR DIST.	NAME	(10) LATITUDE (NORTH)	(11) LONGITUDE (WEST)	(12) REPORT DATE DAY | MO | YR
CT	265	NED	CT	003	06				STUB POND DAM	4148.6	7250.5	05MAR81

(13) POPULAR NAME	(14) NAME OF IMPOUNDMENT
	STUB POND

(15) REGION	(16) BASIN	(17) RIVER OR STREAM	NEAREST DOWNSTREAM CITY–TOWN–VILLAGE	(18) DIST FROM DAM (MI.)	(19) POPULATION
01	CA	NOD BRUCK	AVON	1	10100

(20) TYPE OF DAM	(21) YEAR COMPLETED	(22) PURPOSES	(23) STRUCTURAL HEIGHT (FT.)	(24) HYDRAULIC HEIGHT (FT.)	(25) IMPOUNDING CAPACITIES MAXIMUM (ACRE–FT.)	(26) NORMAL (ACRE–FT.)	(27) DIST DAM	FED R	PRV/FED	SCS A	VER/DATE
RE	1916	R	8	7	30	23	NED	N	N	N	N

(28) REMARKS
22 DATE OF LATEST MODIFICATIONS 24 ESTIMATE

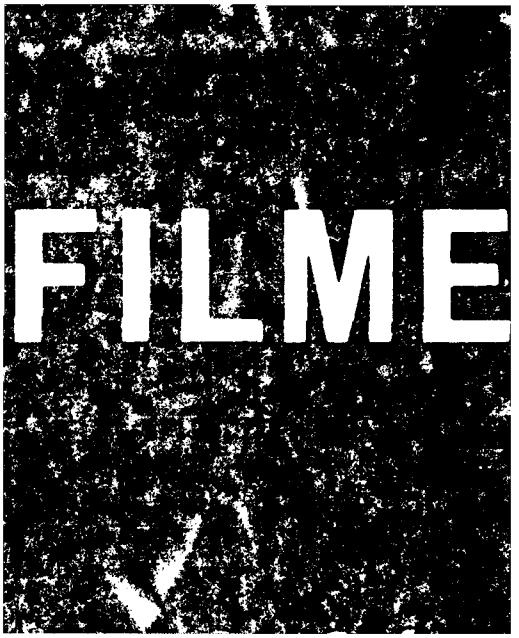
(29) D/S HAS	(30) SPILLWAY CREST LENGTH	(31) TYPE	(32) WIDTH (FT.)	(33) MAXIMUM DISCHARGE (FT.)	(34) VOLUME OF DAM (CY)	(35) POWER CAPACITY INSTALLED (MW)	(36) PROPOSED (MW)	(37) NAVIGATION LOCKS NO	(38) LENGTH (FT.)	(39) WIDTH (FT.)	(40) LENGTH (FT.)	(41) WIDTH (FT.)	(42) LENGTH (FT.)	(43) WIDTH (FT.)	(44) LENGTH (FT.)	(45) WIDTH (FT.)
2	600	U	40	53	2650											

(46) OWNER	(47) ENGINEERING BY	(48) CONSTRUCTION BY
AVON PARKS PROPERTY	UNKNOWN	UNKNOWN

(49) REGULATORY AGENCY DESIGN	CONSTRUCTION	OPERATION	MAINTENANCE
NONE	NONE	CT DEP	CT DEP

(50) INSPECTION BY	(51) INSPECTION DATE DAY | MO | YR	(52) AUTHORITY FOR INSPECTION
JAMES P PURCELL ASSOCIATES INC	13NOV80	PL 92-367

(53) REMARKS
34 APPROXIMATE


FILME